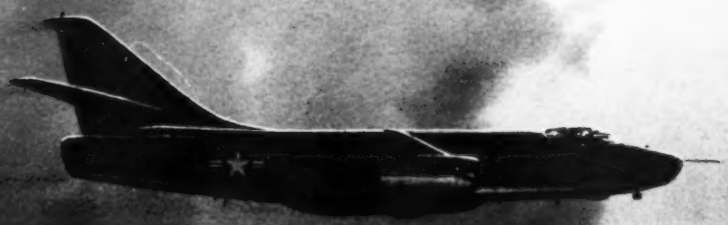
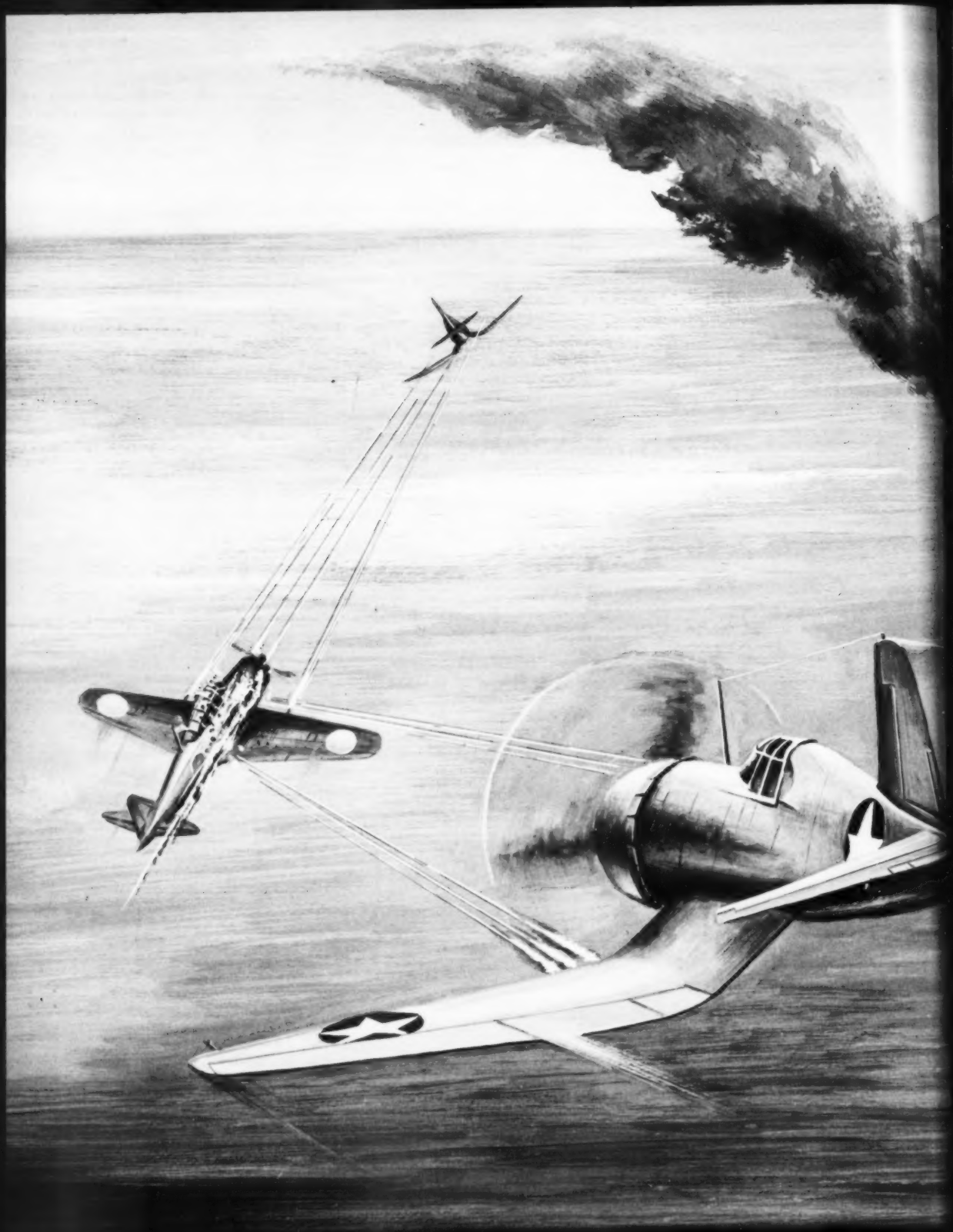
approach

DECEMBER 1967 THE NAVAL AVIATION SAFETY





A Profile of Some Successful Aviators

By COL J.H. Reinburg USMCR (Ret)

Since the airplane became a major implement of strife in the First World War, every facet of aviation has increased in cost and complication. The expense is basically affected by advances in aerodynamics, power plant development plus the ever advancing cost-of-living. The months and years to train military aviators is directly related to the constantly expanding weapons system sophistication and goes hand in hand with related cost increases.

In regard to humans, the desire and ability to be a military aviator are not synonymous. Consequently, because of the expense and time, ways and means are constantly being sought wherein selection can be confined only to the most promising candidates. World War I made it crystal clear that the desirability and guts to fly combat aircraft was far different from just boring holes in the air. From the beginning of aviation through the 1920s, just piloting an airplane was, in itself, considered to be an extremely hazardous *undertaking* (*the pun is intended*). Additionally, using the airplane as a combat weapons system put the enterprise into a near suicidal category. Nevertheless, World War I proved that there is always a certain breed of men who will accept the risks just to pit their skill against other men in personal combat. After all, aerial dogfighting is just a modern version of jousting, dueling,

The program's goal was to study human characteristics, facts and criteria to determine which type of men were most likely to complete the flight course.

cavalry charges, etc. Aircraft improvements and the perfection of the parachute in the early 1930s, elevated noncombat flying to a reasonably safe profession. Then, even military flying began to show greater safety possibilities with fantastic aerodynamic and engine improvements.

When World War II flared up in Europe, armor protection for aircrews improved morale measurably. Then, it got an even greater boost with the invention of self-sealing fuel tanks which considerably reduced the fire hazard when struck by bullets.

A select "group" of aviators

To improve military quality and to further reduce the expense of training naval aviators, attention was given to pilot selection. Consequently, the One Thousand Aviator Study Program was established in 1940 at NAS Pensacola, Fla. The original objective was planned to encompass a wide variety of physiological and psychological tests on 1056 (the actual number) graduate and student naval aviators. The goal was to study human characteristics, facts and other criteria to determine which type of men were most likely to complete the flight course.

All candidates had had at least 10 hours of flight instruction (most of them had soloed) while a few had as much as 1500 hours. The average age was 24 years.

All members of the "group" first filled out a questionnaire pertaining to their history; family, medical, and personal. Emphasis was on nutritional habits, environmental influences, education, vocational and aeronautical motivations, interests, etc.

Subsequently, there were tests of mental ability, mechanical aptitude and athletic achievement. In addition, certain psychomotor or neuro-muscular coordination tests were given. Next in line were visual and perceptual tests. Extensive physical examinations were also a part of the data.

The breakdown of the 1056 men was as follows:

A. 92 of the "group" had already completed flight training and were serving as instructors.

B. 964 were students undergoing flight training.

(1) 761 later completed flight training. Only 128 of the 761 had to be given extra instruction to finally earn their coveted wings of gold.

Ruggedness made the *Wildcat* useful.

(2) 131 (13.5%) did not complete flight training because they failed flight checks given periodically throughout the course.

(3) 31 (3.2%) quit flight training of their own volition for many reasons, known and unknown (personal).

(4) 19 (1.9%) were dropped from the course for administrative reasons, mostly disciplinary.

(5) 16 (1.6%) were found to have developed physical (some mental—just how many and the exact reasons are unknown) deficiencies during the course which caused them to be discontinued.

(6) 4 (0.62%) were killed in flying accidents.

(7) 1 man died of meningitis during the course.

(8) 1 man died during the course as the result of an auto accident.

The "group" in World War II

By the time World War II erupted near the end of 1941 (for the U. S. A.), the first real results of the program were put into effect in the form of Flight Aptitude Ratings. These ratings were incorporated with the standard physical examinations of student naval aviators throughout the war and resulted in incalculable but significant savings in training efforts and costs as well as safer flying techniques.

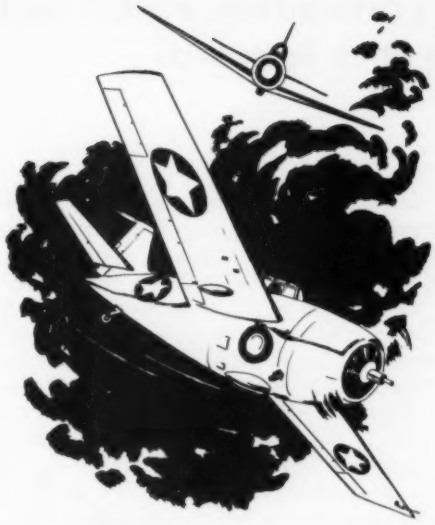
During World War II, 62 (7.4%) of the 853 (761 students + 92 flight instructors) naval aviators were killed in actual air combat actions against the enemy (airborne and anti-aircraft action). It is

estimated that about 90% of the "group" saw combat action against the enemy and 21 became aces (5 or more aerial victories). None of the "group" were known to have been POWs in World War II.

The first of the "group" to experience problems in combat

One of the ranking aces of the "group" almost had his aerial combat career prematurely terminated in his early combat engagements because he could not swim well. Toward the end of a heated dog fight near Guadalcanal, an enemy bullet caused his engine to fail. Being only too aware of his aquatic handicap, he elected to ditch because he could glide into a lagoon near a small island. The ditching was routine and he planned to walk from the wreckage in presumed shallow water. Unfortunately, it was an optical illusion and he suddenly found himself in water over his head. Although wearing a pneumatic life jacket, complacency led him to neglect inflating it. Only the timely appearance of natives in a dugout canoe saved him from drowning.

Almost as a direct result of this near-drowning episode and other similar incidents/accidents, one-



Toward the end of a heated dog fight . . .

Corsairs (F-4Us) on Henderson Field, Guadalcanal, May 1943.

Discussions led to the conclusion that the best bail-out procedure would be to roll the airplane over and jam the stick forward.

man pneumatic life boats (pararafts), (already operational in the RAF and GAF in Europe), quickly became standard equipment for all combat pilots operating over water. Simultaneously, a swimming ability requirement was imposed on all student naval aviators as a mandatory safety precaution.

Readyroom bull session pays off for one of the "group"

Another of the "group" was in one of the early *Corsair* squadrons which were rushed into action before some major bugs had been worked out. One of the troubles came from unpressurized magnetos. It seems that when flying somewhere above FL220 the rarified air would occasionally allow the magneto spark to short-out causing instant and complete engine failure. The pilot had the misfortune of the magneto-arcing power loss at the beginning of a large enemy aerial engagement. He glided safely to the lower altitudes where he was able to restart the engine only to again become involved in another dog fight. While shooting a *Zero* fighter aircraft off his wingman's tail, he himself was shot down by another enemy fighter. Although the F-4U was burning, the pilot managed to bail out unscathed. He attributes his good fortune to readyroom discussion and pararaft practice *before* the ordeal. Up to that time, few pilots had survived a bailout from the very new *Corsair*. Consequently, the discussions led to the conclusion that the best bailout procedure would be to roll the airplane over and jam the stick forward. After the almost routine upside-down bailout, the pilot had no difficulty surviving the night in his pararaft and was rescued by a DD the next day.

The safety lesson here is knowing in advance the best way to use rescue equipment, plus practice where possible.

An early "ejection" technique.

The first jet troubles for a "group" member

In the late 1940s following the conclusion of World War II one of the "group" was assigned to a squadron equipped with the Navy's first operational jet fighter, the FJ-1 (*Fury*). The squadron was commanded by a senior member of the "group" (one of the 92 instructors and also one of the 21 aces). Being an early design, the *Fury* was not con-

Ejection seats came after operational experience with the *Fury*.

figured with a pressurized cockpit, an ejection seat or cabin heat. In essence, it was not a comfortable design by today's standards but a distinct improvement over the World War II fighter aircraft.

About 40 minutes after taking off from an intermediate refueling stop, the pilot had settled onto his selected course at FL350. Shortly thereafter, he noticed unusual vibrations. Upon consulting the engine instruments, he immediately detected an RPM overspeed from the normal 7700 to an alarming 8400. The pegged EGT confirmed serious trouble but a glance to the rear did not reveal smoke and/or fire. Reducing the throttle had no effect upon RPM or EGT so he shut down the engine.

Although above an overcast, the pilot had an azimuth fix from the radio range of an acceptable alternate airport. He was relieved that the absence of fire did not indicate an immediate bailout because four of six pilots had already been killed trying to bail out from the early jet model. The accepted alternate decision was to attempt a dead-stick landing, hopefully, into the airport near the radio range transmitter.

While gliding down, the engine was restarted. Continued roughness and smoke puffs from the tail motivated a permanent shutdown. The tower operator at airport X cleared a descent through the overcast whose base was about 7000′ above the terrain. Everything was going like Pensacola-clockwork as the pilot S-turned onto a long, high, approach to the duty runway with wheels down. At that moment, the the tower informed the pilot that a norad cub was in front of him. Up to that point the *Fury* pilot had been zig-zagging for altitude control and felt he was going to make a perfect touchdown on the end of the duty. The presence of a possible collision situation now encouraged the pilot to save what altitude he could for another runway or an open field. Just after he had assessed that the approach was fouled up, the tower informed the pilot that the cub had waved off in response to their red light and the field was his. It still looked best to try for the duty and accept a hot landing. Following touchdown, in order to keep from running off the far end of the runway into a fence/ditch combination, the pilot blew both

main mount tires and prevented further damage all while keeping the aircraft on the runway.

New tires and an engine change did not cure the pilot's troubles. On the test hop, the new engine vibrated excessively. After a precautionary landing, a close check revealed the absence of a turbine blade. Another engine change got the airplane back on extended operational duty a week later.

This incident along with others were powerful evidence pointing toward the need for cockpit pressurization and ejection seats in subsequent naval combat aircraft.

Follow-up results intermingled with Korea

In 1952, the first complete follow-up survey revealed that 126 (14.1%) of the original number of 853 graduated naval aviators had been killed in noncombat (operational) aircraft accidents. Close to 65% were the direct result of instructing others in the technique of military flying.

Of the total dead (216) calculated in 1952, 27% came from the rolls of the original 128 students *who had been given extra flight instructions to graduate* as opposed to 21% dead out of the remainder.

Three hundred eighty were still on active duty as naval aviators in 1952, but the exact number of the "group" who flew actual combat missions over Korea is not fixed. It is estimated, however, to be about 20.

One of the "group" was missing from a combat mission in late 1950 and presumed dead. In time, however, it was learned that he was a North Korean POW. When he was interviewed upon his return in the summer of 1953 it was learned that he had not been shot down but literally cut down. To escape the very potent ground fire while on a mission deep behind the enemy lines, the pilot flew between some hills. Unfortunately, the enemy had strung cables between the peaks which entangled his *Skyraider* dragging it to earth. Thinking he was lucky to escape the flaming wreckage, the pilot's jubilation was short lived when he was immediately surrounded by enemy troops. The nearly three years of captivity inflicted untold hardships upon him and his POW comrades.

There is a real safety lesson in this *Skyraider* pilot's last combat flight. High tension power lines and other miscellaneous cables strung close to the ground are still bringing aircraft to earth, some in fatal crashes. Pilots must intensify their vigilance when on such sandblower missions. The danger is ever present whether flying low over *enemy* or *friendly* territory.

This fortunate member of the "group" resumed operational flying and continued until his retirement a few years ago.

In 1958 another check of the group revealed that 19 more were dead 3 of whom were killed over Korea while 6 more (of the 19) were killed in operational flying accidents. Miscellaneous non-aviation causes claimed the others.

By 1964, 21 more had died. Only 3 (of the 21) had been killed in operational flying. Those still on active flying duty by the end of 1966 had been reduced to 125. About 25 more, however, are still active as civilian flyers. All told 798 of the group were still alive in early 1967.

A significant number of the group has been promoted to admiral and USMC generals. One has become a general in the air national guard of his home state. About 5 of the "group" have already served in Vietnam.

The study is continuing, concentrating on members who are still engaged in active flying in spite of the fact that they fall in the Class III category, being over 45 years of age. Plans are being formulated to re-check most of the "group" to produce a comprehensive 30-year report. Emphasis will be expanded into mental aspects. This is expected to produce some very useful results because the many older survivors can provide some long range highly educated facts. They are now mature middle-aged men who can better understand the extended program and what a significant contribution their experiences can make to military aviation.

Courage

Perfect courage is to do unwitnessed what we should be capable of doing before all the world.

La Rochefoucauld Maxims (1665)

QUICK THINKING

After completing several practice approaches during an enroute delay on an instrument round-robin flight, the pilots of an SP-2E received clearance to begin the final leg of the hop. As the *Neptune* climbed to its assigned altitude the trip light for the number 1 a.c. generator illuminated.

The plane captain, after first checking all the associated circuit breakers and switches, attempted one reset with no success. He then activated the test circuit. The trip light remained on, indicating a fault in the generator itself.

The instructor continued the climb and informed the student pilot and the plane captain that he planned to disconnect the generator after they levelled off at 8000′. When the gages settled down, a 2 to 3 lb rise in BMEP would then provide an additional indication of disconnect.

Passing through 6500′, the port nacelle fire warning light illuminated, quickly followed by the disconnect light on the number 1 a.c. generator. The student pilot reduced power on the port engine and activated the disconnect switch. The afterstation observer simultaneously reported that smoke was coming from the port nacelle.

The port engine was secured using the Feathering/Fire checklist, while the pilot turned back to the field they had just left and began an emergency VFR letdown.

At 5000′ the pilot dropped the gear and selected 20 degrees of flaps. When it first came out of the wheel well, the port wheel appeared to be on fire, but shortly thereafter the fire went out by itself. Witnesses to the incident, both on the ground and in the air, reported no indication of fire from 4000′ to landing.

The landing was uneventful and the aircraft was taxied clear of the duty. As the *Neptune* came to a full stop, the fire blazed up once again in the port wheel well. The crash crew was on hand and they immediately put out the blaze.

The aircraft was secured only 9 minutes after the trip light flashed its first indication of trouble. No one was injured and the aircraft received only minor damage.

In commenting on this near disaster, the squadron CO noted that, "The proximity of a suitable landing site when this incident occurred was undoubtedly instrumental in the safe termination of the flight. However, the pilots and crew demonstrated commendable professionalism in handling this emergency. The instructor pilot's timely decision to immediately drop the gear when he ascertained the location of the fire certainly contributed to the subsequent safe landing and minimized fire damage to the aircraft. A tire explosion in the wheel well was a distinct possibility had the gear drop been delayed."

Needless to say, an explosion in the wheel well could have ruptured the fuel tanks and led to an extensive inflight fire. If it had occurred at altitude, such a fire might even have precluded a ditching situation and forced a hasty bailout.

As the sun recedes south toward Capricorn, aviators should condition themselves for n FR w

WINTER WEATHER FLYING HAZARDS

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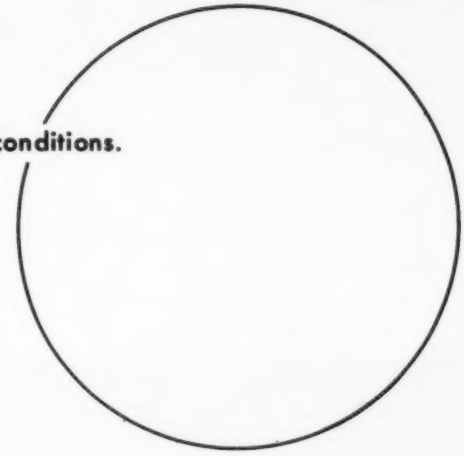
for m FR work and not the best of takeoff and landing conditions.



Lowering temperatures and freezing rain are usually the first observed weather conditions to usher in the late Fall. Besides planting lots of inflight ice on aircraft, the cold moisture tends to make the runways slippery.

Next comes snow which is generally not as much an inflight problem as freezing rain since it seldom collects on the leading-edge as ice. It does, however, create IFR conditions. Moreover, it spawns all sorts of undesirable runway problems. It makes them slippery and hazardous in freezing rain. Additionally, it clogs and disguises the pavement to unpredictable degrees varying with the amount of snow that falls. More than several inches of snow is reason to close an airport until it is plowed. Then the pushed-aside snow becomes a barrier which can cause a good collection of aircraft damage every winter.

Jets Traverse the Freezing Level Any Time of the Year

While it takes near winter conditions on the surface to cause snow and ice runway trouble, flights to the higher altitudes can experience icing difficulties at any time of the year. Recently, an F-8 was sitting on the deck during a summer rain. Some of the water got by a broken seal and settled around the control linkage. On the next flight, the pilot of the *Crusader* leaped up to FL 380 and commenced a straight and level course. When it came time to maneuver, he became alarmed because the stick could not be moved fore or aft. After some pushing and pulling, he was able to get enough movement to commence a descent and this gave him a respite to further study the difficulty. As he descended below the freezing level, full control movement was restored. After some careful and calculated inflight checks, the pilot landed without incident.

Subsequent investigation concluded that rain water in the linkage area had frozen at the higher altitudes and caused the restriction. When back at the lower, and therefore warmer levels, the ice had melted and all became normal.

An A-4 pilot was making an IFR descent through intermittent clouds and freezing rain. When down to final approach level off, he dirtied up the *Skyhawk*. As he decelerated through 150 kts, the slats partially failed to extend. One slat extended while the other did not, causing unintentional lateral rolls at an uncomfortably low altitude. His instant reaction was to add power. The acceleration retracted the extended slat and normal control was regained. The pilot then correctly concluded that the uncooperative slat had been frozen IN by moisture. Alternate stick stirring and rudder kicking ultimately broke the freezing grip on the stuck slat and a normal and safe landing was accomplished.

Winter Icing Can Be Experienced at Any Altitude

Helicopters have their share of ice troubles also. Two SH-3As were airborne on a cold night when occasional light drizzles were forecast. The ceiling and visibility were expected to remain VFR. True to form, however, the weather did not cooperate and both *Sea Kings*' windshields became coated with ice and their forward visibility was nullified. Fortunately, both birds were close to home and the pilots landed safely by looking out the side windows. Windshield ice is a twofold danger to the SH-3A because it not only restricts forward visibility but if pieces of ice can be melted off, they are very likely to be ingested in the gas turbine engines where they can cause damage and possible subsequent power failure.

Man-Made Ice Barriers

Every winter plowed snowbanks contribute to accidents. An A-4E had a snowbank episode in full daylight. Hung ordnance and intermittent radio trouble apparently distracted the pilot as he turned on to final for the duty. The pilot searched for the

A little bit of snow . . .

. . . can cause big trouble.

meatball but none existed on that particular runway. It was later concluded that these distractions and snow glare caused the pilot not to observe the presence of an 18″ high snow bank (left by the snow removal vehicle earlier in the day) across the approach end of and 52′ down the duty. On landing, the icy ridge sprung the starboard MLG and the *Skyhawk* began swerving to the right as the strut collapsed.

The pilot added full power in an attempt to get airborne but speed was insufficient and the airplane, now out of control, struck another snow bank on the side of the runway. Before coming to rest just off the duty, the nose gear collapsed. There was no fire and the pilot got out uninjured.

Runway Snow Traps a Big One

Snow plows had been hard at work to open up a runway but a thin pack of the white stuff still hid the concrete. Consequently maintenance crews had been directed to paint a black stripe on top of the remaining snow and ice to indicate the center of the runway. Unfortunately, the landings of other aircraft and a new snowfall all but obliterated the temporary centerline stripe.

Upon approaching the field in daylight VFR conditions, a C-118B crew was informed of the above mentioned landing conditions. Additionally, they were informed that a recently landed transport had reported braking action poor and rough spots on the runway from ice bumps.

The copilot of the *Liftmaster* thought he could make out the temporary black runway stripe and pointed out his observation to the pilot. The exact approach end of the duty was obscured in

snow causing the pilot to aim for what was left of the temporary black line only visible farther down the hidden pavement. Consequently, the pilot overflew the first 1000′ of swept area and touchdown was ultimately 1100′ beyond the approach end of the duty. After rolling 1200′, the cleared area was narrowed by random piles of plowed snow and ice.

The pilot did not like what he saw and thought of a waveoff. Unfortunately, however, before takeoff steps could be initiated, the number 2 prop sliced into a snow pile causing the aircraft to swerve to port. The hard turn sheared the nose wheel strut allowing numbers 3 and 4 propellers to gouge concrete as the C-118B came to a grinding halt on its nose.

Snow Contour Variations Are Hard to Differentiate at Night

Another snowbank caught a group of flight personnel napping at night, while FCLP was in progress. It would appear that none of them made specific notes of nearby snow and ice banks *before* darkness had enshrouded the field.

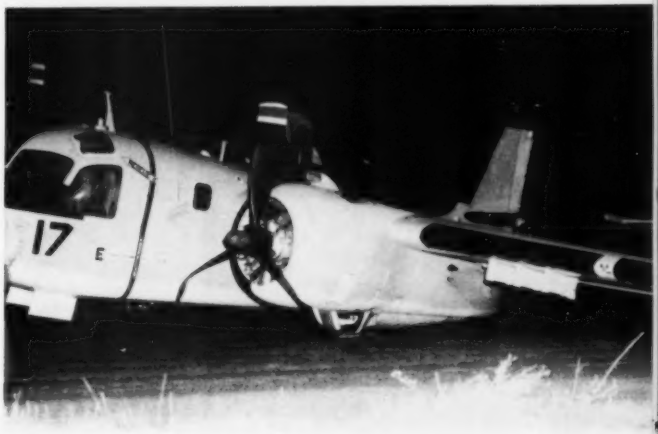
Indicating 95 kts after touchdown on the third FCLP night bounce, the pilots of an S-2E felt a sharp jolt from the port MLG area. Before any investigation could be accomplished, the airplane was airborne with no directional control difficulty. However, before the wheels could be retracted, the pilot noticed a barberpole indication on the port main mount. The two pilots decided not to attempt retraction until they investigated further. Paddles and the tower operator were informed and a request was made for an inspection of the touchdown spot for meaningful evidence.

Meanwhile, the S-2E crew attempted some airborne sleuthing. Hydraulic pressure was normal; hydraulic fluid level was normal; white flashlight inspection of the port gear, as best as could be seen through the nearest side window, seemed to indicate the wheel was DOWN in the locked position and the tire was not blown. The normal appearance of everything led the crew to believe that only the microswitch was faulty. Nevertheless to be on the safe side, the gear was pumped DOWN manually. The UNLOCKED indication persisted, however.

About 10 minutes later, the orbiting *Tracker* crew was informed by the LSO that at the touchdown spot two sonobuoys were found on the pavement. Also nearby was a ridge of ice and snow which had been left by a snow plow several days previously. Closer inspection of the nearly 3′ high ice mound revealed a groove which *could* have been made by the aircraft's wheel.

Twenty more minutes of orbiting took place while

Circumstantially, the groove in the snow indicated damage . . .



. . . to the port main landing gear.

the pilots and ground personnel discussed the circumstantial evidence and agreed upon the best course of action.

After dumping fuel, an approach to a precautionary landing was commenced with the barber-pole still showing. With flaps set at 2/3, initial touchdown was made on the starboard side of the runway to give more room for maneuvers to hold up the port wing as long as possible in case the MLG collapsed. At first, all was encouraging but after about 1500' of roll, the port MLG was felt to give way. Full aileron held up the wing for only a few seconds more. At the pilot's command, the copilot cut the mixtures and feathered the port prop. As the barely rotating prop began ticking the runway a left turn developed. Hard right brake momentarily kept the aircraft going straight and cleared the prop for a moment, but, ultimately, the S-2E swerved off the left side of the pavement and came to a stop on its port engine nacelle, starboard MLG, nose gear, and tail. The crew exited unscathed and no fire ensued.

These snow-bank accidents point out the importance of extra briefings when operations are to be conducted on such abnormal runway conditions. Units would be wise to carefully plot every ice/snow pile which could interfere with takeoffs and landings.

NATOPS Contributions

It seems pertinent to close this article with good advice on ice from the NATOPS Instrument Flight Manual which has superseded the NavWeps All Weather Flight Manual. With regard to plowed snow or ice banks on and near runways, however, there is no written word so pilots must exercise their 20/20 vision in correctly assessing the topography.

'Structural Icing Conditions'

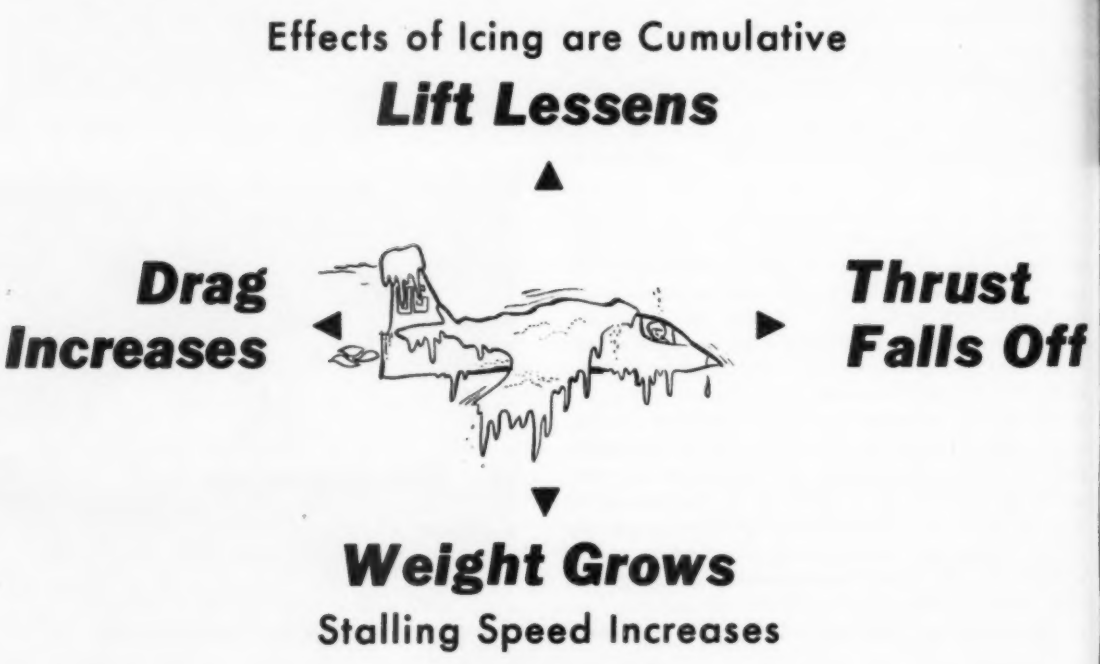
The following procedures are recommended when structural icing is expected or encountered.

1. Avoid prolonged operations in weather conditions that could lead to the formation of structural ice. Monitor the outside air temperature gage.

2. Increase airspeed when climbing or descending through icing conditions. This accomplishes a threefold purpose: it decreases the length of time spent in icing conditions; the decreased angle of attack reduces ice accumulation on the underside of the airfoils, control surfaces, and fuselage; and the increased speed is necessary during approach and landing due to the increased stall speed caused by an ice buildup.

3. Do not lower flaps or landing gear until needed. Ice collects rapidly on flaps and landing gear. This adds to the weight of the aircraft and can possibly cause structural damage if they are retracted when covered with ice.

4. Keep controls moving to keep ice from jamming the control surfaces. This is also true of trim tabs and governors. Both should be cycled occasionally to assure that they remain free.



5. Climb to escape freezing rain.

6. Sleet particles are frozen raindrops which indicate a layer of freezing rain above. In sleet, it is best to maintain altitude as sleet will not adhere to the aircraft.

'Aircraft Engine Icing'

Carburetor Icing. The reciprocating engine, under certain conditions, is subject to carburetor icing. This problem can develop in two ways; as ram or impact ice, or as fuel evaporation ice. Impact ice is formed under the same conditions as aircraft structural ice. Supercooled liquid moisture impinges on the intake duct or enters the carburetor and freezes on impact. The dangers inherent in such ice formation are the cutting off of the air supply to the carburetor, jamming of the throttle mechanism, or plugging the free and ram air ports of the fuel metering system.

Fuel evaporation ice is formed within the carburetor. The combination of the evaporation of gasoline and the drop in air pressure through the carburetor venturi can cool the incoming air as much as 25°C. If there is sufficient moisture condensed, and a temperature drop in the carburetor to between 0°C and a few degrees below freezing, ice can form. If the carburetor air temperature is lower than about —10°C, the moisture will go directly to snow and pass on through without difficulty. Fuel evaporation icing often forms in clear weather when outside air temperatures are well above freezing and its most common form is a buildup of ice in the carburetor throat. Usually, there is no indication of its presence until engine power is seriously reduced or lost altogether.

The induction systems on most present day piston engine aircraft inhibit the formation of ice but, unfortunately, cannot prevent it completely. The formation of induction icing is most commonly prevented by the use of an alternate air system. This is basically an ice prevention system and should be used prior to entering conditions that could cause induction ice to form.

Be suspicious of carburetor ice anytime there is a loss of manifold pressure/BMEP when outside air temperature is between +5° and +25°C in clear air, and between —5° and +25° C in clouds or precipitation, and there is no other sign of engine trouble.

Note: Keep the carburetor air temperature within the limits recommended by the applicable NATOPS Flight Manual.

Turbine Icing. Turbine engines, whether prop or pure jet, are subject to structural ice that obstructs engine air intakes. This reduces the volume of air available to the engine and shows up on the instrument panel as a loss in RPM and an increase in exhaust gas temperature. The conditions that lead to jet engine intake icing are the same as those that cause other structural icing, namely liquid moisture and freezing temperatures as described in previous paragraphs.

When in icing conditions in jet aircraft, and a combination of EGT rise and RPM drop is noted, suspect engine icing and land at the nearest suitable airfield. Normally, deicing systems for the prevention of jet engine intake ice are found only on transport aircraft.

So much for what the NATOPS Instrument Flight Manual says. Additional useful information can be found in an article entitled, "Would You Believe Ice?" in the Nov 67 issue.

Short Snorts

One More Time

After installation of the No. 2 engine condition actuator in a CH-46A, a ground turnup was required. The pilot started the engines, engaged the rotors and checked flat pitch on both engines. The crew chief then requested that the aircraft be shut down so that he could make an adjustment on the actuator arm.

After making the adjustment, the crew chief asked the pilot to pull the No. 2 engine start and ignition circuit breaker, position the engine condition lever to FLY and raise the collective full UP. He checked the movement of the actuator, then requested another turnup.

There was a small fire when the No. 2 engine was started, but it burned itself out almost immediately.

Again, the flat pitch was checked and the crew chief asked that the aircraft be shut down so that he could make additional adjustments on the actuator arms.

The adjustments were made on both the No. 1 and No. 2 actuators and the crew chief asked the pilot to again pull the circuit breakers, move the engine condition levers to FLY and raise the collective. After checking the actuator movement, the crew chief asked for yet another turnup.

The pilot reset the circuit breakers, then placed the No. 1 engine condition lever to START. Fire immediately erupted from the engine exhaust and intake. The crew chief informed the pilot of the fire and began to discharge a portable fire extinguisher into the exhaust area. The pilot moved the engine condition lever to STOP, turned the ignition, fuel valve and fuel boost pump OFF, then moved the engine condition lever back to CRANK. There was no fire warning light or any other abnormal indication on the engine instruments.

Since the fire was still burning, the pilot pulled the No. 1 engine fire handle and discharged one of the fire extinguishers into the engine compartment. Additional personnel arrived on the scene and used portable fire extinguishers at the intake barrier filter and the exhaust area. Shortly thereafter, the fire was put out and the pilot secured the aircraft.

The direct cause of the accident was the pilot's failure to follow NATOPS procedures for engine shutdown, and deviation from standing instructions covering the conduct of post maintenance turnups. Basically, he didn't know the aircraft.

While the engine condition levers were being cycled to check the movement of the engine condition actuators, the fuel valves were open and the boost pumps were ON. This allowed fuel to be pumped into the engines and it pooled in the combustion chambers. When the engine condition lever was placed in CRANK during a normal start attempt, the fuel ignited.

Extensive damage to the No. 1 engine barrier filter and minor damage to the No. 2 engine barrier filter resulted. The investigation further disclosed an overtemp condition throughout the engine.

Oversight, haste and a gap in their technical knowledge of the aircraft left two supposedly experienced and qualified people with some explaining to do.

"Navy 489, this is Argentia tower, where are you??????"

Inflated Rate-of-Climb Indicator

A new rate-of-climb indicator with an expanded scale for readings below 1500 fpm is scheduled to appear in all new aircraft delivered in fiscal 68. See Fig. A.

Figure A-fter

Figure B-efore

According to the Naval Air Systems Command, Service Test Flight Evaluations demonstrated the advantages of the two-inch Vertical Velocity Indicator which expands the more critical half of the dial to be comparable to that portion of the scale for 0 to 3000 fpm (see Fig. B), without sacrificing much of the 1500 to 6000 rpm half.

Well Done

Months of training in emergency procedures paid off recently when the flight deck crews aboard USS RANDOLPH expertly and professionally rigged a barricade in 60 seconds to recover a crippled E-1B.

The emergency arose when the tailhook of the *Fudd* snapped off on the pilot's first landing attempt. After the green shirts' quick work with the barricade, emergency fire and crash crews stood by as the pilot made his second pass. The aircraft touched down smoothly on centerline and rolled into the barricade (see photo). Damage to the aircraft was later classified as minor.

This was the second time in two weeks that the barricade was rigged for real aboard RANDOLPH. The two successful engagements ended a 6-year period during which no emergency situations had required use of the barricade. After standing by for so many years, the flight deck crew was able to demonstrate that they had been ready all along.

Training is a continuous and thankless process of education, but the satisfaction that comes with putting it to the test far outweighs the time and effort spent in learning procedures. One life or one aircraft saved makes time of little consequence.

Speak Up

The big transport stopped short of the runway as No. 2 for the active. While the crew was accomplishing an engine runup, the No. 1 aircraft, an F-4, was cleared to line up.

As the F-4 moved toward the runway, the crew of the transport noticed a large puddle of liquid about five to six feet across and half the length of an F-4, which appeared to be fuel. Then as the F-4 engines started accelerating, the transport crew noticed an unusual flame pattern from the right engine, which was repeated when the F-4 started takeoff.

Shortly after takeoff, both of the F-4's engines flamed out and the fire warning lights came on. The crew ejected safely. The transport and the F-4 were on the same radio frequency until the fighter was cleared for takeoff. After that, a message could have been passed through the tower, but wasn't. Large puddles of liquid aren't normal. Speak up when you see something unusual on another aircraft and give the other pilot the word.

—Aerospace Safety

An E-1B takes the barricade.

If you have any questions regarding instrument flight procedures, send them to:

Commanding Officer
VA-127
NAS Lemoore, Calif. 93245

ON THE GLIDE SLOPE

1. What is TERPs?

■ **The United States Standard for Terminal Instrument Procedures. This handbook contains criteria which shall be used to formulate, review, approve and publish procedures for instrument approaches and departure of aircraft to and from civil and military airports. These criteria are for application at any location over which an appropriate United States agency exercises jurisdiction.**

2. Are all published instrument approach minimums currently in the TERPs format?

■ **No. The TERPs system has only recently been implemented and only a few approaches have appeared to date in the new format. Until all the procedures are revised, both the new and old minimum formats will apply as published.**

3. What readily available publications contain an explanation of new terms introduced in TERPs.

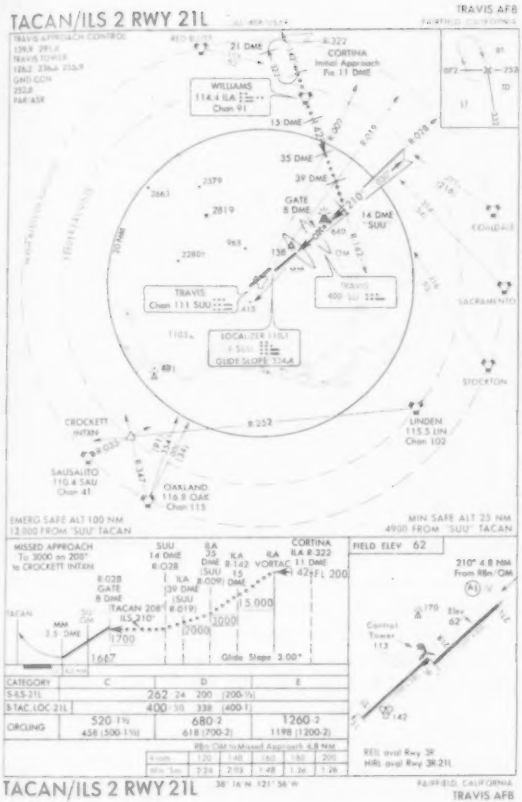
■ **FLIP IFR—Enroute supplement, Special Notices Section; and a special insert has been placed after the index in the FLIP Instrument Approach Procedures books, as well.**

4. What is the meaning of the categories C, D & E as applicable to landing minimums at Travis AFB as shown on the approach plan reproduced here?

■ **Five approach categories (A thru E) now control landing minimums for different types of aircraft, except for certain military aircraft which are placed in a higher category for operational reasons. Aircraft are categorized on the basis of speed and weight as follows:**

Approach Category	Speed/Weight
A	Speed 50-90 kts, weight 30,000 lbs or less
B	Speed 91-120 kts, or weight 30,001 to 60,000 lbs
C	Speed 121-140 kts, or weight 60,001 to 150,000 lbs
D	Speed 141-165 kts, or weight over 150,000 lbs
E	Speed over 165 kts, weight not considered

Speeds are based on 1.3 times the stall speed



in the landing configuration at maximum gross landing weight. An aircraft shall fall in only one category, that being the highest category in which it meets either of the specifications. Landing minimums will be listed only for those categories of aircraft authorized to make a particular approach. Straight-in landing minimums for a specific approach are normally the same for all categories; however, circling minimums are usually different for each.

5. To what altitude may a single-piloted, tacan only, USN aircraft descend on final approach to Rwy 21L straight-in when shooting the approach shown here?

■ **400′ MSL. 400′ MSL is the published Minimum Descent Altitude (MDA) and is authorized until the airport or runway environment is in sight.**

6. What weather criteria apply for a multi-piloted USN aircraft with a gross weight of 65,000 lbs to commence the Travis Tacan/ILS 2 Rwy 21L approach to Rwy 3L?

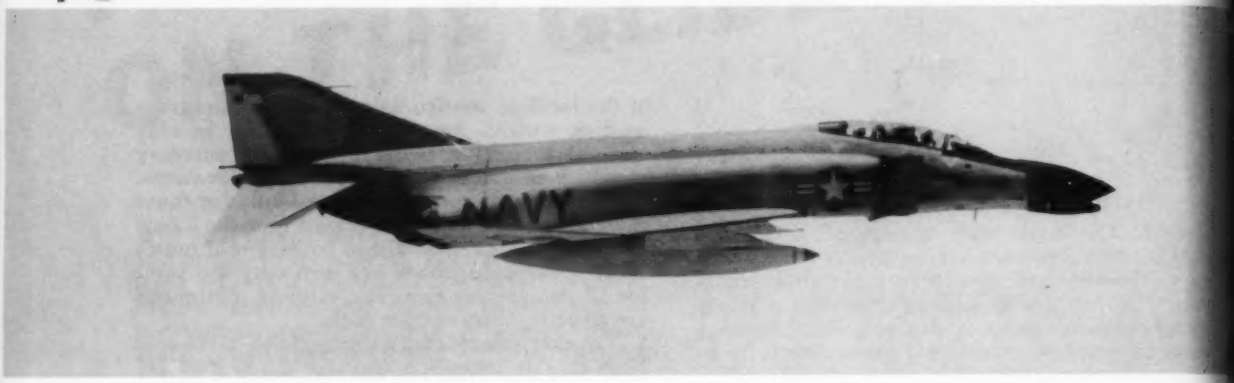
■ **500 x 1½. A circling approach is required to land on runway 3L and the above mentioned aircraft falls into approach category C due to gross weight. OpNavInst 3710.7D (section 563) states that except in an emergency, instrument approaches in reciprocating and turboprop multi-piloted type aircraft shall not be commenced when the reported weather is below approved published landing minimums unless it has been determined that the aircraft has the capability to proceed to an alternate airport in the event a missed approach must be executed.**

7. In order to commence the Travis Tacan/ILS 2 Rwy 21L approach to a landing straight-in to Rwy 21L in tacan only, single-piloted USN aircraft, what minimum conditions of ceiling and visibility must prevail?

■ **400 x 1. OpNavInst 3710.7D (section 563) states that a USN aircraft may commence an approach, to a landing, when the reported weather is at or above the minimums prescribed for the approach. The (400 x 1) as prescribed in the landing minimums is the weather criteria necessary to commence the approach.**

NIGHT VFR

VERY FEW REFERENCES



Every naval aviator knows that VFR means visual flight rules. Most experienced night fighter pilots, however, might agree that the abbreviation should stand for "Very Few References."

According to the Metmen, there are far more nights which they class as VFR as opposed to the IFR. When learning to fly, the student always is confined to VFR daytime weather, at least until he has mastered safe solo takeoffs and landings. During this primary flying period, he almost always has a clear cut visual horizon. Moreover, the visibility is better than three miles so that the ground is an additional fixed and exact reference point. As his training progresses, he is taught the art of instrument flying (complete reliance on flight attitude instruments in the airplane). Coincidently, VFR night flights are commenced. Immediately, the student pilot realizes there is no clear cut horizon and often, none at all. Moreover, estimating one's height above the ground by the eyeball method is most confusing. When there is absolutely no horizon at all, the ground lights tend to merge with the stars at some infinite distance. It is not even easy to be sure that lights on other airborne vehicles are not cars on the highway or distant stars.

After an expensive training program, the naval aviator is graduated, awarded his wings of gold, and starts operational flying in high powered and speedy jet aircraft. Owing to the high velocities and high altitude, there is seldom a time when jet flights can be made under pure VFR conditions. Night operations further compound the problem. Moreover, when working over the ocean (a common situation for the naval aviator) eyeball height estimating is very dangerous and any thought of a visual horizon is almost always confused between the blend of sky and water.

To illustrate the pitfalls of so called night VFR combat jet operations, herewith are narrated some tragic and expensive accidents.

An F-4B was on a night intercept training flight. After two successful intercepts on the target aircraft, a descent to 4000′ was directed to get some low altitude practice at random forward quartering intercepts. The target airplane was directed to indicate 300 kts at 6000′. After sending the two aircraft in opposite directions for 40 miles, they were reversed by the ground control intercept operator. The interceptor simulated Sparrow firing at five miles head-on and then turned to reposition itself for simulating a stern shot with Sidewinder.

Assuming the interceptor to be behind him, the target pilot became alarmed when radio communications between them seemed to be defunct. Upon reversing course, the target pilot observed a bright orange light on the water some 13 miles away. Such circumstantial evidence initiated additional investigating and it was ultimately proved that the light had

been, indeed, the burning wreckage of the interceptor.

There were no survivors and the wreckage sank in deep water so that recovery was next to impossible. The final report said that the cause of the accident was undetermined.

In another case a *Crusader* was flying the section wing position at night while firing Sidewinders at flares used for targets. After the section leader had fired his missile successfully at a flare dropped by another aircraft, the wingman took the lead for his firing turn. Two flares were dropped and ignited at the same time inadvertently instead of the scheduled one. At about 10,000′, where the flares ignited, the F-8 pilot radioed his "Tally-Ho" and squeezed off his missile at about one mile while closing rapidly. In rapid succession thereafter, the section was in and out of the flare light. The wingman (section leader for the mission) immediately went on the gages thereby saving most of his night-adapted vision. Upon emerging he could not see the F-8 he was following. Several minutes later, the section leader and the flare drop aircraft pilot observed fire on the water. A little debris recovered later on the surface of the ocean proved to be from the missing *Crusader*. The pilot was not recovered.

The cause of these two accidents has been basically classified under pilot disorientation. Once confused about the airplane's attitude, one of two maneuvers usually precede such a crash. (1) The plane dives into the surface at a high rate of speed; (2) The disorientation leads to a stall/spin condition as a prelude to a gyrating crash.

Circumstantially, there is strong evidence that pilot disorientation started the chain reaction which led to both crashes. Since there were no survivors in either crash and wreckage recovery was meager, there are always other possible causes. In such situations it is SOP to throw in the generality that there might have been a material failure or malfunction.

Any naval aviator who does not feel competent to go fully IFR in an instant, better get in an application for some more instrument training. The smart pilot is always semi-IFR so that he is never caught with his eyeballs caged under any circumstances.


Litton
Transition

Most pilots agree that it may take several minutes to feel at home in an aircraft immediately after takeoff. The length of time will vary with proficiency in the particular model. Daily flights generally allow maximum efficiency. Unfortunately, the assignments of many military pilots are such that they are lucky to get airborne once a week.

Adding to the problem is the fact that most operational takeoffs are conducted at or close to maximum gross weight. Consequently, flight characteristics during the takeoff phase are often not the most comfortable. Unplanned difficulties suddenly appearing after takeoff immediately compound the situation while demanding instant, unmistakable reaction.

The degree of pilot alertness and at-home feeling can often save the day. The NATOPS Flight Manuals of all naval aircraft devote numerous pages toward safe takeoffs under a variety of crises created by mechanical failure and/or weather peculiarities. Each model aircraft is different and, frequently, there are detectable variations between identical models so that pilots must take every step to be totally at-home in a specifically assigned aircraft. Moreover, alertness to sudden weather changes must be a continuous chore. One hundred and seventeen takeoff phase accidents occurred in naval aviation from 1 January 1965 to 20 April 1967. A variety of examples are herewith narrated.

In and Out of the Flood Lights

A carrier was cruising along on a very dark, horizonless night. Suddenly, a man fell overboard and the alarm was sounded to get the rescue helicopter airborne. Deck floodlights were turned on immediately to assist in getting several helos ready. A selected crew (pilot, copilot and two crewmen) quickly manned a UH-2A. During the preflight period, the pilot was twice informed of the wind conditions (7-8 kts—not down the deck) and on both occasions he was heard to say something like, "I'll give it a try."

Nine minutes after the alarm was sounded, the helo rose from the deck and was observed to hover about 5′ as if the pilot was not sure of which way to go. At the same time it was yawing as it drifted slightly toward the port side of the ship. Things started to stabilize as the helo gained another 10′ and subsequently started accelerating reaching an estimated 50 kts when passing out of the floodlit deck into the darkness. Then it began a gradual descent and struck the water about 1000′ forward of the now motionless ship.

After impact, the UH-2A sank in less than a minute. The crew survived, with the exception of the pilot. The accident was classed as undetermined. There is strong evidence that the pilot became disoriented due to insufficient time to become fully night adapted. Flying a helo from the brightly lit deck into the surrounding darkness by VFR is an extremely hazardous practice. The eye needs more time to adapt to such adverse conditions. A possible contributing factor was inadequate instrument scan.

Incomplete Checklist Routine

Two *Crusaders* started rolling for a section takeoff. Liftoff in MRT was normal but after gear retraction, the wingman experienced a settling of his aircraft with the initiation of wing transition. Increasing the angle of attack slightly did not make things any better so he selected AB. The sink rate continued

It came to a skidding stop on the overrun.

until the belly of the F-8 began scraping the remaining runway. After initial touchdown, the pilot realized that something must be wrong so he secured the engine and rode it through a skidding stop on the overrun. Luckily no fire ensued and the pilot exited safely.

Investigation revealed that the pilot neglected to place the cruise droop in DOWN, thereby denying the aircraft wing sufficient lift to match the climb attitude of the section leader. When the pilot went into AB, he could have remained airborne had he considerably increased his angle of attack. Such a maneuver, however, though salvaging this immediate situation could have led to a midair collision in the midst of several other sections in the pattern.

IFR Expected but Unexpected

A pilot was scheduled for a familiarization flight in an A-4B. The weather was VFR except for smoke and haze up to about 1000′. It was estimated that the visibility could be down to ½ mile in patches off the end of the runway. The situation was common to the airport in question so that it had been SOP to allow pilots on fam flights to file such limited IFR clearances.

Departure Control approved the pilot's flight plan and off he went. Unfortunately, an undetected fog bank had moved in with the smoke (not uncommon for the area) and immediately after liftoff, the pilot found himself in zero visibility conditions. He admitted later that he felt "rusty" in the cockpit and because of the cautious feeling, he reduced the nose-up trim excessively after liftoff. Upon entering the fog, he did not transition to the gages and apparently tried to maintain visual contact with the ground.

Thrust was failing.

The aircraft initally struck two small tree tops at about 45′ above the ground in a wings-level attitude. This was a point about 7800′ from liftoff. Two hundred feet further on he was in a 45-degree nose-up attitude when the aircraft clipped off two bigger trees 65′ above the ground. In spite of losing the major portion of his port wing to the taller growth the airplane zoomed up enough to let the pilot eject safely. The pilotless *Skyhawk* then nosed over again and clipped some power lines just before impacting with the ground.

Engine Failure Immediately After Wheels-Up

The heretofore listed accidents all involved varying degrees of pilot factor. Here is one where the pilot was prepared for transition difficulties and handled the situation very well.

Assisted by the plane captain, the pilot made a thorough preflight inspection of his A-4B and found everything in order. With a wingman, he led a section takeoff and assumed a normal climbout after cleaning up the machine.

One mile out from the takeoff runway indicating 250 kts and climbing through 1000′, the lead detected engine vibrations. A quick glance at the engine instruments revealed nothing unusual for his takeoff setting of 98 percent rpm and 615° EGT. Hoping that easing the throttle back might cure the vibrations, he reduced the power control setting. This did not help so he pushed the lever forward to the stop. This did not restore thrust and declining airspeed confirmed a definite loss of power. His low altitude left little time for extensive instrument cross-checks other than plans for an immediate ejection. He was headed toward a housing community but managed to turn toward an open field and in a very few seconds safely punched out. The aircraft, now in a ballistics flight path, impacted in an uninhabited pasture.

Investigation later revealed that the loss of turbine blades caused the emergency and ultimate loss of the aircraft.

When an engine fails during the critical takeoff phase, pilots must know, instantly, the NATOPS emergency procedures by memory. There may be little time to stop and reason things out.

Pilots must be totally prepared for the transition from normal VFR scan to the more exacting one demanded for instrument flight, while always being prepared for rapid weather changes. Practice makes perfect. Know your NATOPS procedures thoroughly for your assigned model so that your transition from takeoff to professional flying will come naturally.

The Flight Before Christmas

By LT Robert F. O'Connor and Robert Trotter
with apologies to Clement Moore

Now listen closely and you shall hear,
The strangest tale in many a year.
The story of how, on a Christmas long past,
My meeting with Santa was nearly my last.

Canto I

'Twas the flight before Christmas
And from all over the base,
The crew had assembled,
For the flight to take place.

The pilot was busy preflighting
the craft,
Checking fuel load and compasses,
flight plans and raft.

He was weary and worn but with
no thought of bed,
For visions of home danced
around in his head.
Our baggage was stowed with the
usual care,
In hopes for a smooth ride through
unstable air,
And I in my hardhat with chin-
strap pulled tight,
Settled down in my comfortable
seat on the right.
The crew climbed aboard through
the new fallen snow,
All carefree and happy and anx-
ious to go.
With checklists completed (we
knew them by heart),
I raised up a thumb—we were
ready to start.
Then out on the wing there arose
a loud clatter,
And I turned from the gages to
see what was the matter.
Both engines were high time, but
for this hop they'd run,
We got clearance to taxi, the
flight had begun!

The moonlight, reflected by new fallen snow,
Gave the ice on the runway a cold, eerie glow.
Now lurching, now skating, to the duty we slid,
And conducted our runup in a slight starboard skid.
We got clearance to take off, climb and report,
And I hoped as we rolled that we wouldn't abort.
We swerved and we slithered, then at once we could tell,
That we'd broken ground safely and had our wheels in the well.

Canto II

IFR was the way that our flight plan decreed,
And relieved after takeoff, our pilot put down his beads.
Then we all settled down to the tedium of flight,
Lookouts peering intently at the depths of the night.
The night was so dark, there was barely a light,
From stars or moon to guide us right,
"Fear not," said our pilot, his voice calm and dry,
"Always travel on gages—it's the only way to fly."
Then suddenly what, to my eyes should appear,
But a miniature sleigh and eight tiny reindeer,
Closing fast from below—we had to be quick,
For I knew we were about to collide with St. Nick!

"Pull up!" I screamed, my hair all on end,
"Great snakes! Christmas Eve! Will this be our end?"
Lucky for us my reflexes were quick,
I gave a great heave and pulled back on the stick.

More rapid than eagles our courses converged,
And as he whistled on by us, my heart gave a surge.
With the reindeer in front and a small sleigh behind.
It was too small a target for center radar to find.
We looked back with awe as he sped through the night,
With no visible means to sustain him in flight,
And I shuddered to think of the Yuletides to come
And the damage to all that might have been done.

My friend, it was truly an incident rare,
And in silence we churned on through the night air,
Silent and pensive, no longer carefree,
Each one straining his eyes through the darkness to see.
Overcome by the thought of whom we had met,
We finished the flight, our palms damp with sweat.
The landing was smooth, executed with skill,
We rolled to the line and shut down the mill.

Canto III

Then we trudged through the snow to report to Base Ops,
Glad to be done with our most hectic of hops.
"A near-miss!" the OD surprisedly cried,
"You'd better believe it," our pilot replied.
Then the questioning started, and midst all the fuss,
A great ruckus commenced on the roof above us.
There's no dancing allowed on the roof at Base Ops,
But something was there and it pulled out all stops.

The noise shook the building from ceiling to floor,
And without wasting time I jerked open the door.
We were startled, dumbfounded, completely surprised,
For there stood St. Nick, right in front of our eyes!
He was overage for a pilot, and too fat to boot,
With a crazy fur collar on a red poopy suit.
His beard was the wildest, his hardhat insane,
His hair was a snowy white, tousled old mane.

He pointed to the roof and spoke rather warily;
"Have to park my team, but just temporarily."
Then he entered and said with his voice in a hiss,
"Where the hell do I go to report a near-miss?"
"Check with the OD," I said, "he'll give you a form."
The old boy roared, "Thanks," his voice like a storm.
He strode to the desk, slammed his fist without pause,
And cried, "Service, young fellow, don't snit Santa Claus!"

Canto IV

Then he spoke not a word, but
went straight to his work,
And filled out the forms—how
his pencil did jerk.
Our pilot worked calmly, he was
no fool,
While Santa struggled and snorted
and lost all his cool.

Our pilot, an eagle, then lifted
his face,
And said, "It was your fault, old
man, you were in my airspace."
Santa's face got all red and he
threw up his hands,
"My fault," he roared, "You didn't
check your NOTAMS!"

The NOTAM file was handy, as
they usually are,
And there was Santa's notice—
he'd filed Special VFR.
"Gee, Santa," gulped our eagle,
"You sure do have your proof,
"This shows that it's easy for an
old pro like me to goof!"
Reassured of our intentions,
Santa's anger quickly faded,
His cheery smile returned and his
laugh began unaided.
"Full well this shows," he said
with glee, "how man can go
amiss,
"But in aviation, as you know,
mistakes don't lead to bliss.
"When I set about to fly at night
in my wingless craft," he said,
"My preparations are complete
before I climb into my sled.
"I've picked a star to guide my
flight and weighed up all my
loads,
"Then I've checked the NOTAMS,
fed the herd and polished
Rudy's nose.
"But now I'm late, so all take
heed,
"And learn about the things you'll
need.
"Don't be complacent, don't
assume,
"And on Christmas Eve, give me
plenty of room."
Then Santa whacked our pilot on
the back,
Filed a new clearance and
shouldered his pack.
With a smile and a nod he went
out into the snow,
And we followed, all hating to see
Santa go.
Then laying his finger on the side
of his nose,
To the roof of Base Ops he
smoothly arose.
He called out his team, and with
a wink on his face,
Off they all flew, straight out into
space.
And we all heard him say,
As he drove out of sight,
"Happy Christmas to all,
And to all a safe flight!"

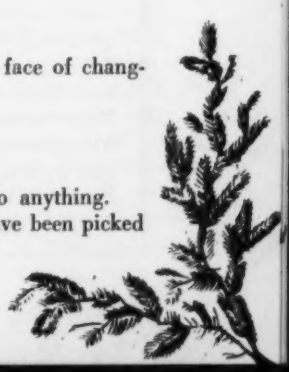
(The following article is based on the text of the pocket-size Survival and First Aid Manual of ROOSEVELT *(CVA-42) compiled by two CVW-1 flight surgeons, LT H. S. Berg and LT B. E. Berry. The necessities of a combat survival and evasion situation, of course, may modify the literal application of some of these suggestions. Your squadron survival officer can elaborate on many of the areas touched on only generally here.)*

Down Safe and Sound

27

O.K. Now you're down safe and sound. Whether you have landed in the Sierra Mountains or the jungle of southeast Asia, with which this article is concerned, the most important thing to do is control and use your mind as an instrument to plan, to think, to remember, to imagine, to invent, to hope, to control yourself, to direct your efforts. *The side of survival that goes on in your mind—the mental element—is the most important part of survival.*

- Study your plight optimistically.
- Arrange for basic needs.
- Set definite goals.
- Expect to have to re-organize in face of changing situations.
- Cope with your fears.
- Keep yourself busy.
- Fit yourself to the country.
- Most important, don't give in to anything.
- Remember that most survivors have been picked up within the first 72 hours.



Concealment

Let's begin with some words on the important subject of concealment. In the first place, avoid clothing which contrasts with the background. Khaki and green equipment is designed to blend with most natural backgrounds. Sometimes it is desirable to wear leafy branches around your head and shoulders.

When under observation, don't move. It is safer to stand still than to run for shelter. If you have time, drop flat on the ground, keeping your head down. Take care not to silhouette yourself against a light background.

Water and Food Procurement

Rain, dew, streams and lakes are all sources of water. The bamboo plant at each notch has a small quantity of water in it. All water should be boiled for five minutes or the Halazone tablets in your SEEK-2, Packet 2 should be added, two to three tablets per quart of water. Let this sit for 30 minutes after the tablet has dissolved; the longer the water sits before consumption, the better.

An average man can exist in hot climates on two quarts of water per day engaging in little exercise. The greater the exertion, the more water needed. A ration of a pint a day can be maintained only a few days without body dehydration. Remember to take two salt tablets (in your SEEK-2, Packet 1) per quart of water. Take one salt tablet at a time. Wait 10 to 15 minutes, then take the other; many times taking two together will cause nausea.

With limited water supply the first rule is to ration the supply as follows:

- Don't drink your daily ration all at once. Drink 4 to 8 equal quantities per day. Do not try to extend a small portion of water over a number of days though, drink what you have and look for a source of supply.
- Eat less. Digestive processes require water.
- Salt tablets increase water demand. If you have water, take salt tablets. If not, do not.
- Conserve perspiration. We normally lose a quart of water per day in the form of sweat. To avoid sweating, avoid sunlight and exertion. This may be difficult if you're traveling. The solution is to take it easy, move slowly. Along the seashore you can cut down perspiration by keeping clothes damp with sea water. Do not drink sea water at any time. No water at all is better than sea water.

In breaking camp or moving from a resting place, remove signs that you have been there. Be careful about cigarette butts and paper debris. Avoid leaving a trail.

Jungle Survival

Night in the jungle comes very quickly so prepare for bed early. In the mountains during the rainy season (October-April), the temperature can drop to 45 to 50°. Avoid sleeping on the ground because of chill and insects. Most stories of wild animals and snakes are tall tales. (No incidents of contact have been reported thus far.) What may scare you are the howls, screams and crashing sounds made by monkeys, birds, insects and falling trees. Don't let these get to you.

The real danger in the jungle is insects. There are many ticks, leeches, scorpions, centipedes and spiders. They can all create infection and cause illness. Check your body and your clothing frequently and get rid of them.

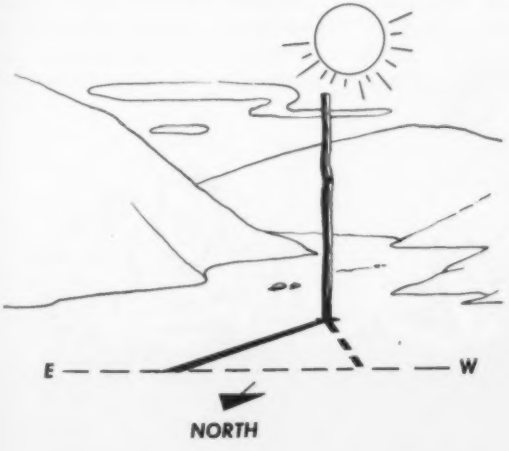
In the jungle even the slightest scratch can cause serious infection within hours. Treat all scratches with the bacitracin ointment you will find in your SEEK-2, Packet 1.

Attention to and care of your clothing is important. Tuck the bottom cuffs of your flight suit into your boots. Wear your gloves and keep your sleeves rolled down and buttoned for protection against leeches, insects and scratches. Don't forget

Food Procurement

- Four rules:
  1. Eat nothing which is bitter, unless you know it is harmless.
  2. Avoid all plants with milky sap, black-eyed grains or those which look like parsnip.
  3. Eat anything you see a monkey eating, *not* anything you see any animal eating.
  4. Never eat raw products from fields in Southeast Asia. Human manure is used for fertilizer, passing the diseases along with it.
- Edibility test:
  a. Eat ½ teaspoonful, wait 3 to 4 hours.
  b. Eat a teaspoonful, wait 3 to 4 hours.
  c. Eat a handful, wait 8 hours.
  d. If no harmful effects, the plant is safe.
- The eggs of any bird may be eaten raw.
- Always cook fresh water fish and all shellfish, including snails. Salt water fish may be eaten raw.
- You must have water if you eat. Eating without water hastens dehydration.

to put on your headnet which is in your SEEK-2 Packet 2. Use safety pins to seal holes in headnet and clothing. In the morning, ideally, you should take off your clothes and make a thorough examination of your skin for insects. If you can, wash your clothes, especially that extra pair of socks daily. In open country, as in high grass, remember to wear a hat as protection against the sun.



If you have decided you have to travel, you should have a good reason for doing so. Having decided to travel, pick an immediate nearby objective which offers advantage of shelter; upon reaching it, select another. Select the equipment you will take. Take too much rather than too little; some can always be discarded *(taking care not to leave a trail in unfriendly territory.—Ed.)*.

If you have lost your compass (there's one in SEEK-2, Packet 2), stick a branch at least 3′ long into the ground. Mark the tip of the shadow once and then mark again a second time 10 minutes later. A line drawn between the two marks points east and west; the second point is always east. Facing east, your left hand is always north and your right hand is always south.

Cloud formation may give you a clue to your location. If you see an area of open sky which remains clear for a day or more while other parts of the sky are clouded, it may indicate ocean. Take the course of least resistance, but remember for evasion and concealment the easiest route is not always the best.

Stop in Bad Weather

When the weather gets bad, stop. Keep up a moderate but steady pace. Travel a set amount of time and then rest. Rest several times a day. Take time out to gather food and water. (See boxes.) In fact, subsistence problems may leave only half a day for travel.

Take good care of your feet. Dry them as soon as possible after getting them wet. When resting, remove your shoes, wiggle your toes and bend your ankles. *(See "Foot Care," page 32.—Ed.)* Take precautions against sunburn. It can make you too ill to travel. In tropic areas you may have to stop during the hottest hours of midday. Natives do this.

When fording streams, never fight the current. Float diagonally downstream in a horizontal position to reduce effort. If you are in a weakened condition, use a log or other flotation gear.

Patience and determination are your chief allies in primitive land travel. Remember 3 to 5 miles a day is considered fine progress. In the jungle, travel by day. On the coast and in delta regions, travel by night. Avoid trails as they may be booby-trapped. If you enter a friendly camp, obey the customs. Always enter in daylight by the main gate. Avoid all populace if possible, however; make contact only as a last resort. If necessary, barter items for aid but hang on to your blood chit as long as possible.

Above all, maintain the *will to survive*. If you ever find yourself in a survival situation, you can be confident that an all-out effort is being made to find you.

notes from your flights

Ejection

REACHING for the face curtain with both hands in order to eject in a spin, a F-4B pilot discovered the handles were about 3″ below the top of his helmet. To pull the curtain in this position would necessitate bending his head forward and down, a poor position for ejection. He reached for the seat pan firing handle with his right hand and placed his left in his lap. The handle guard was in the up position. He released the handle, pushed the guard down, grasped the handle again and pulled it.

The pilot's seat pan firing handle ejection procedure was incorrect in that he did not grasp his right wrist with his left hand. This could easily have resulted in severe injury or loss of his left arm.

When the pilot saw two F-4s and a SAR aircraft circling the area he removed two Mk-13 Mod 0 signals from his Mk-3C, located the day smoke end of one, read the directions and ignited it. As a chopper approached he ignited the second signal. In that he carried neither revolver with tracers nor pencil flare kit, he placed himself in the dangerous position of having an inadequate supply of signalling devices, the survival officer reported.

The survival officer's recommendations were:

- That in training the necessity for following proper ejection techniques be emphasized.
- That the flight gear of all aircrews be thoroughly inspected by the aviators' equipment branch prior to flight to be certain that aircrews are adequately equipped with all the necessary survival equipment.

Mirror

THE PILOT used both a mirror and a pencil flare to signal after overland ejection and parachute descent. SAR forces reported that the mirror had visibility characteristics superior to those of the pencil flare due to daytime conditions.

—Aviation equipment officer

Bird Strike

WHILE passing through 4000′ and indicating 350 kts, an A-4C struck a bird. The impact shattered the center panel of the windscreen and buckled the frame and broke the port side panel in two places. Bird and plexiglass fragments broke the gun/rocket sight assembly from its mount, broke the gunsight support assembly, shattered instrument glasses, cracked the autopilot disconnect button mount and broke the stick grip on the right side. The major

Rescue Sling

FOLLOWING midair collision, ejection and parachute descent, an instructor RIO was rescued from the water by helicopter. He placed the "horse collar" around his torso and under his arms with the pick-up cable behind him. This made his hoist somewhat precarious, the investigation report noted, since in this improper position it would be easier for him to fall out.

Aviation Clothing and Survival Equipment Bulletin (BACSEB) 30-59, General Instructions for Survivors Concerning Equipment

1. Approach sling from side opposite cable.

2. Extend arm through loop of sling.

3. Slip sling over shoulder and head.

ht surgeon

portion of the bird lodged between the ejection seat headrest and the seat catapult rail. Portions of the bird struck the probe light lens on the starboard air inlet causing it to shatter and enter the engine.

The pilot, his helmet visor chipped and covered with blood and pieces of bird, slowed the aircraft to 200 kts and despite windblast and extremely reduced visibility, made a straight in approach and successful landing.

The pilot had only a small cut on his neck which required one stitch. He undoubtedly was saved from more serious injury, the squadron report states, by his helmet visor which was down at the time of impact.

Preparedness

"I DO feel that all previous Navy pilot training, squadron emergency procedure, survival training and, in particular, the Tactical Sea Survival Course at Langley Air Force Base contributed towards a mental and procedural preparedness that allowed me to meet this emergency adequately."

—F-8C pilot after ejection

Routine

AN ALERT and well-trained rescue helicopter crew made the water pickup look like routine business.

—Flight Surgeon in MOR

Ears And Plugs

USE of Mickey Mouse ears alone in a high decibel noise area will not preclude hearing loss, a flight surgeon reported at a recent Safety Council meeting. Personnel must wear ear plugs *and* Mickey Mouse ears for positive protection. The council recommended that all personnel who are required to work in these areas obtain ear plugs from the medical department. The plugs come in three different sizes and must be fitted.

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and Procedures Used in Helicopter Rescue Operations, shows step-by-step how to get into the rescue sling. In the accompanying drawings, personal survival equipment has been omitted for clarity.

4. Put other arm into loop of sling and slip sling over other shoulder.

5. Position in sling after proper entrance prior to hoisting.

6. Hoist position in sling.

In a land survival situation, transportation is courtesy of "shank's mare," so high on your list of priorities should be the best possible care of your feet. As one attack carrier's survival and first aid manual states, "Those feet are your saviors. If you can't walk, you can't evade." And what applies in southeast Asia applies equally in the wilds of ConUS—if you must travel to a more advantageous campsite or pick-up point, your feet are going to have to take you there.

Generally speaking, foot care principles are the same no matter what the climate or terrain. The cardinal rule is *keep your feet clean and dry.*

If you should get your feet wet, dry them as soon as possible, apply foot powder and put on dry socks. In a survival situation, you should change your socks as often as you can and wash them after you take them off. Your body heat will dry out wet socks placed under your clothing next to your skin. Some authorities recommend wearing wool socks in both the tropics and the arctic to absorb maximum moisture. Others recommend two pair in the tropics, an inner pair of nylon and an outer pair of cotton. In any case, you should carry spares.

Wash your feet at least once a day. Soap and water are best but if they are not available, "dry clean" your feet by rubbing them with your hands to remove dirt. In the tropics, air dry your feet in sunlight daily if possible. If you have to sleep in a sitting or reclining position, elevate your feet. When you stop to rest, take off your shoes and exercise your toes. In a cold weather situation, flex your toes inside your shoes to promote circulation and keep your feet warm. Numbness indicates the possibility of frostbite.

Blisters

Blisters can be a problem no matter where you are. To begin with, to prevent blisters, your flying boots should fit well, be in good condition and be broken in. Avoid wrinkles in your socks. If you get a pebble or a piece of trash in your shoe, stop and remove it before it causes trouble. Keep your toenails cleaned and cut straight across. Rounding of toenail corners is the most frequent cause of ingrown toenails.

The most important thing to remember about blisters is *never pop or drain them because of the danger of infection.* Here are a few handy hints on the prevention and care of blisters from a pair of fleet survival manuals. ROOSEVELT (CVA- 42) manual says: "If a blister starts to form, treat it with a protective covering of ointment. A good tip is to rub that portion of the sock where the blister is forming with your candle from your SEEK 2 kit so that this area will be waxed and will slide over the site. Another tip is to have a small tube of airplane glue in your vest. Put a couple of coats of glue over the blister which has been covered with bacitracin ointment, also from your SEEK-2 kit, and let the glue dry. Apply three or four coats and you essentially have a layer of protective skin over the blister."

The survival medicine handout of Attack Carrier Air Wing 15 recommends rubbing chapstick or candle wax on the blister itself.

Fungus Infection

Because the heat and humidity in the tropics constitute the ideal environment for fungus, it can become a real problem. Here's advice from the Special Training Division, Naval Amphibious School, Little Creek, Va.:

"Preventive measures against fungus infection comprise keeping the feet dry and clean. Wear dry footgear and preferably wool socks to absorb the moisture. Change the socks as frequently as possible and always wash them after removal. If, however, a fungus does develop, it will be increasingly necessary to keep the feet clean and dry. The application of a dessicant medication and/or fungicidal ointment will aid in arresting the growth. Once a fungus has developed, it generally will never be completely

destroyed. If an unfavorable environment is created by medication, dryness or cold, the fungus spores will not grow but will lie dormant until such favorable conditions exist. Expedient drying agents available in the field may include pollen, moss, shredded leaves or bark, grass seed, saw dust, etc."

Medications in the Federal stock system useful in arresting fungus infections are undecylenic acid foot powder, FSN 6505-515-1584, and undecylenic acid ointment, FSN 6505-664-4814. A 1/5 oz container of the powder is in your SEEK 2 kit. The ointment is to be spread evenly over affected areas each night and washed off or wiped off in the morning and the foot powder applied. It should be used for several weeks after the skin has healed.

Immersion Foot

Immersion foot, a condition common both to the tropics and to colder areas, is characterized by a white wrinkled appearance of the foot. Immersion foot can become so painful that it is difficult to walk. In colder climates, immersion foot can develop with continuous exposure to moisture for a period of six hours. In the tropics, immersion foot can develop in 48 hours, constituting a particular problem in operations in coastal lowlands in constant heavy rainfall.

Silicone Grease Experiment

In a recently reported experiment ("Prophylaxis of Warm-Water-Immersion Foot," 11 August 67 *Navy Medical News Letter*), silicone grease was shown to markedly retard or prevent the development of warm water immersion foot up to five days.* Fifty-two Marine volunteers had silicone grease applied to their feet every 24 hours. Six volunteers acted as a control group and did not have benefit of silicone grease. The men's feet were wet at all times; they walked 5 to 10 miles a day for 5 days and slept in their wet boots and socks. Mild or early changes of immersion foot developed in 6 of the 52 "silicone-treated" men but all completed the test. Five of the six control volunteers developed immersion foot, four of whom were unable to continue beyond the third day due to the severity of their symptoms.

Silicone treatment of the standard issue socks worn was apparently ineffectual in modifying the development of immersion foot although this requires additional studies, the experimenters stated.

The importance of air-drying the feet was also evidenced by these tests. Supervisory personnel who were exposed to the same frequency of immersion and marching but who removed their wet boots and socks and air-dried their feet each night *did not* develop immersion foot. The length of air-drying time is important, the experimenters said. During earlier studies, subjects who removed their wet boots and socks for 30 minutes three times a day and dried their feet developed immersion foot just as readily as control subjects.

All cases of immersion foot in the experiment cleared up one to three days after removal from the wet environment.

*Authors of the experiment report are Dr. L. J. Buckels, Naval Medical Field Research Laboratory, Camp Lejeune, N. C.; Dr. K. A. Gill, Jr., Dept. of Dermatology, Naval Hospital, Camp Lejeune; and Dr. G. T. Anderson, Bureau of Medicine and Surgery.

Frostbite

In arctic or cold weather survival situations, the biggest danger to your feet is frostbite. The fact that feet perspire enables cold to be conducted through regular footgear. Try to keep your feet dry. Remember that clothing keeps heat out as well as in. Men have been seen to set their boots smouldering while complaining that the warmth of the fire was not helping their cold feet. Remove your shoes and gently knead your feet while changing to dry socks if possible.

To maintain good circulation, and keep your toes warm, wiggle them inside your shoes. If you discover numbness or frozen spots, thaw them immediately using your warm bare hands or other sources of heat. Don't forcibly remove frozen shoes; thaw them first. *Don't rub or exercise a frostbitten area.* This can tear and bruise the skin and cause further tissue damage. *Never* apply snow or ice to frostbite; this only causes more cold injury. Never soak frozen toes in gasoline or kerosene. This results in more cold injury and irritates the skin.

Extreme care must be used in applying warm water to frostbitten areas as the numb, frozen tissue can be severely injured by applying too much heat. If no warm water is available, wrapping the frostbitten area in heavy fabric and applying heat packs is effective.

The old adage applies to the subject of foot care: An ounce of prevention is worth a pound of cure!

For those interested in pursuing the subject of cold water immersion foot and frostbite further, see the following *Navy Medical News Letters*; "Local Cold Injury," Vol. 26, No. 11; "Immersion Foot," Vol. 27, No. 5; "Immersion Hypothermia," Vol. 29, No. 1; "Cold Water Immersion," Vol. 31, No. 12; "Navy Problems in Cold Weather Medicine," Vol. 32, No. 10; "Frostbite," Vol. 35, No. 3 and "Frostbite" Vol. 38, Nos. 9-10. See also "Cold Injury," pp. 8-13, and "Frostbite," pp. 30-32. January 1962 APPROACH.

Stacked Deck

For those who have not been there, the point of no return in the flying business is important when navigating over oceans. When trouble develops, it is obviously best to turn around if you have not yet reached the half way point. Beyond that, you might as well keep going and do some extra thinking as well as praying.

Probably, the most critical item on long over ocean hops is fuel. Consequently, it is unwise and downright dangerous to make such flights with any part of that system malfunctioning.

Such a crew departed Hawaii for the mainland in an elderly SP-2E knowing one of the fuel transfer systems was malfunctioning. The NATOPS flight manual for that airplane has this to say about the Fuel Transfer Sequence:

"Under normal conditions, fuel in the wing tip tanks, bomb bay tanks, and center section tanks is transferred to the main tanks before being fed to the engines. Fuel in the wing tip tanks and bomb bay tanks is first transferred to the center section tanks before being transferred to the main tanks. Float valves placed in the center section and main tanks, together with the transfer-booster pumps, automatically accomplish fuel transfer in the following sequence:

"When the fuel level in the main tank drops to 2880 lbs (480 gallons), the float valve in No. 1 cell opens, allowing fuel in the center section tank to be transferred to the main tank.

"When the fuel level in the center section tank drops to 3600 lbs (600 gallons), the float valve in the No. 4 cell opens, allowing fuel in the wing tip tank to be transferred to the center section tank.

"When the fuel level in the center section tank drops to 1500 lbs (250 gallons), the float valve in the No. 1 cell opens, allowing fuel in the bomb bay tank to be transferred to the center section tank."

The First Card

The known discrepancy was that fuel would not transfer from the bomb bay tanks until the level of the center section tank was down to 900 lbs. This makes a 600 lb differential. By itself, this variation in the sequence of the float valve opening does not seem important. It would appear that something in the system was deteriorating the automatic opening of the float valve. Such a situation would not normally be critical as long as homeplate or an alternate is less than an hour away. But this crew attempted a 2000-mile-plus jump over nothing but water. For such a venture, *all the fuel that could be poured aboard was required.* Consequently, the go-juice system was one which should have been in satisfactory working order. Fuel that cannot be pushed into the engines is just so much dead weight.

The Second Card

The red warning light which tells the pilot that the bomb bay tanks are about empty, due to a reduction of transfer fuel pressure, was inoperative.

The Third Card

Moreover, the gages on the bomb bay tanks were not working. To circumvent this barrier, the pilot decided to interrupt the fuel transfer sequence and put tip tank transfer last on the list.

As this guts ball crew approached the point of no return, it was estimated that the bomb bay tanks were empty and that wing tip fuel transfer had commenced.

The Fourth Card

Soon thereafter, it was detected that the port tip tank would not transfer. After all efforts were exhausted to obtain the use of the 200 gallons of now critical fuel, the tip was jettisoned. It was later found that the intentional jettisoning of the full tip tank increased drag rather than reduced it. Obviously, this further hindered what might now be considered a marginal fuel supply to reach the mainland.

The Fifth Card

As most people know, trouble usually runs in bunches. Just before the tip tank failure, it was noticed that the port prop was acting up. It would only change pitch in response to the manual toggle switch, and then only at a slow rate. To help com-

There are 52 cards in a deck. If the position of even one of these is known to your opponent(s), your chances of winning are reduced. Do you like these odds?

pensate for the tip tank fuel loss, it was decided to reduce RPM. Then it was further discovered that the RPM was not fully controllable.

The Sixth Card

Next on the trouble schedule, the navigator calculated that the headwinds had increased in velocity. All of these little tid bits of gloom seemed to indicate that after fuel exhaustion, the plane might make it to the Farallon Islands (in a feathered glide), some airportless rocks about 32 miles short of the destination. Moreover, the SP-2E glides with the aerodynamics of a *brick*.

The crew did not buy that old adage of "coming in on a wing and a prayer" so they kicked off the other tip tank after consuming its fuel. Then they deep-sixed 500 lbs of personal gear (just how personal is not known).

A Winner Anyway

The Lord helps those who help themselves; the headwinds slackened and the props were still rotating when they stopped in the chocks at their destination.

So, they made it, and with fuel to spare. So what's the problem? Everybody loves a winner regardless of how they made it. The inflight anxiety and the loss of some personal gear should surely make this crew a believer in maintenance gripes in the future. Let us also hope that it will be a reminder to other crews to not takeoff with so many cards already stacked against you. Winning is difficult with questionable cards.

CANOPY CARE IN WINTER

The search for materials and the design of transparent canopy areas have been very thorough, but so far only plastics can be formed to aircraft configurations and still maintain acceptable optical quality. However, plastics for all their advantages of optics, weight, strength and molding ability, have drawbacks.

The most troublesome problem with transparent plastic enclosures? They scratch too easily. The resistance of transparent enclosure plastics to solvents has been increased nearly tenfold, but their resistance to solvent and scratch is still far below that of glass. In the present state of technology, this is a penalty which must be accepted.

Routine cleaning and careful waxing according to instructions will do much to protect these vital surfaces. In a sense, the wax can be considered as a sacrificial coating, functioning in the same manner as wax on an automobile or furniture.

Removing Ice and Frost

Removal of frost and ice from unprotected, stowed or parked aircraft can be accomplished by three methods; mechanical, thermal, or chemical.

The low resistance of transparent plastics to abrasions rules out mechanical methods such as rapping or scraping.

Thermal methods, either hot air or infrared radiation are quite satisfactory for use on transparent enclosures if the maximum temperature of the enclosure surface is kept below 120°F.

Chemical methods of frost and ice removal depend on a water solution of a material capable of electrolytic dissociation. The greater the dissociation the greater the depression of the freezing point. A common example of this is the addition of glycols to liquid cooling systems of automobiles. Another is the use of a salt such as calcium chloride to rid streets of ice. Of the two examples given, the glycol solution is relatively noncorrosive and may be employed for extended periods in a liquid cooling system. On the other hand, salt solutions are very corrosive to most metals. A salt spray exposure test is universally used to assess the value of corrosion preventive systems. Obviously, the risk of corrosion denies the use of salts for ice/snow removal from aircraft. Glycol and alcohol solutions have been successfully used for many years. Commercial airlines prefer the glycol over the alcohol.

Solvents can damage plastic surfaces; there are severe limits on the choice of fluid for de-icing or frost removal.

Glycol and alcohol tend to run off before they can dissolve or melt the ice or frost. For this reason, spraying is recommended. Use a very fine fog; the

fluid that runs off is wasted. When the ice crystals of the frost are melted, wipe the enclosure with a clean soft cotton flannel cloth soaked in the glycol or alcohol. Alcohol will probably work better for this wiping operation.

For ice removal, use a heavy soft cloth similar to a blanket. Wet this with glycol or alcohol and squeeze or wring to a nearly drip-free condition. Lay the blanket directly on the ice coating. Additional glycol and alcohol should be added as the "melting" progresses. The blanket prevents the glycol or alcohol from running off. The blanket must be free of all foreign matter such as sand and grit, and may be laundered and used repeatedly.

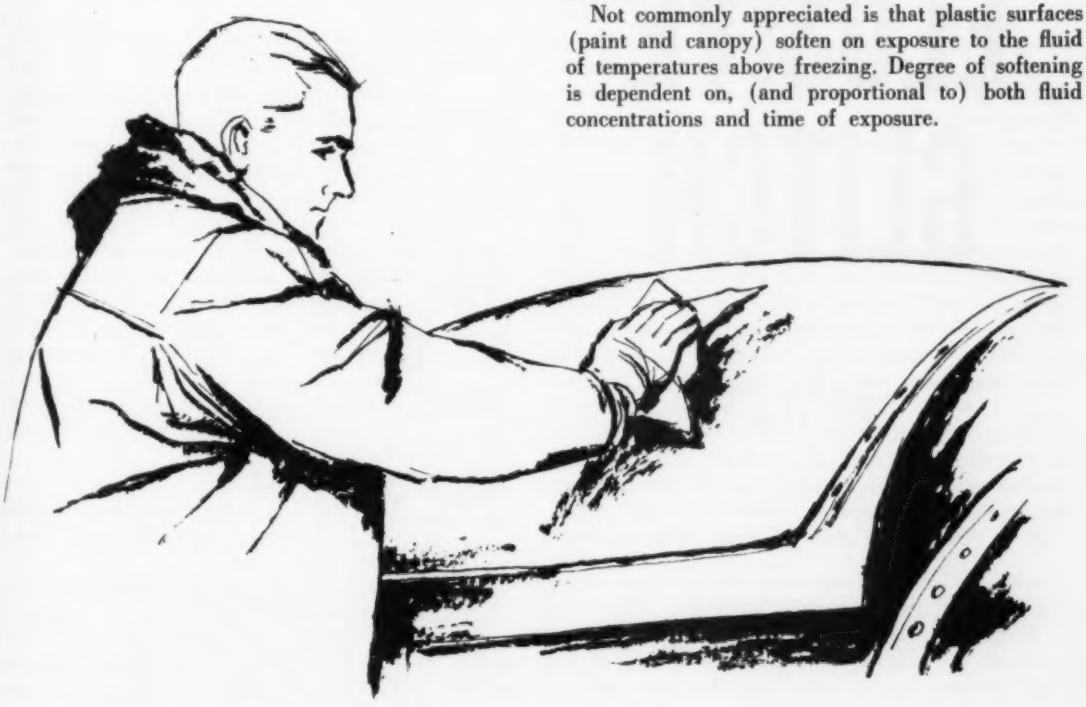
This method of ice removal should introduce sufficient glycol or alcohol into the water so the runoff will not freeze elsewhere on the aircraft. A final wipe of the transparent area with an alcohol wet cloth is suggested.

The basic resin of the acrylic transparent enclosure, the aircraft paint, is the same as the finish on most automobiles. Using concentrated (full strength) glycol or alcohol will mar the transparent enclosure and the aircraft finish just as it would the automobile finish.

If the aircraft is to be flown immediately, the air stream will blow away the residual glycol or alcohol. If the aircraft is to stand, the remaining glycol or alcohol should be flushed off with water.

Be very careful if it is necessary to clear ice from aircraft surfaces. Anti-icing and de-icing—defrosting fluid (Mil-A-8243) should not be used on exterior surfaces unless the fluid is diluted with an equal amount of water (ethylene and propylene glycols). In temperatures above freezing the fluid must be rinsed off the aircraft with water spray. Do not rub the fluid-coated surface.

Not commonly appreciated is that plastic surfaces (paint and canopy) soften on exposure to the fluid of temperatures above freezing. Degree of softening is dependent on, (and proportional to) both fluid concentrations and time of exposure.



The man who cleans the canopy may not be aware that innocent-looking spots and scratches show up larger-than-life at altitude. . .

—Adapted from Northrup F-5 Service News

ELUSIVE GLITCH

By
LCDR Ray Hill
ASO, VA-83

Here's a short story that took a long time to develop. Its origin began with a *Skyhawk's* fuel transfer squawk. Its ending came 3 months later but only after 3 squadron movements and 42 flights, 9 of which brought the ailing bird screaming back into the break with a fuel transfer failure.

During this course of events, many gray hairs, monumental man-hours of work and a multitude of unnecessary material expenditures had accumulated. This summary of pilot and mechanic's writeups together with the author's comments (*ital*) tell the story of the frustrations of both. It's passed on to you in hopes that if similar squawks come your way you will be better prepared to solve them.

Pilot: Transfer light came ON and fuel quantity went to 1100 lbs. Emergency system works OK.

Mech: Replaced trans. pump. Turnup checked OK. (Note: Removed pump appeared bad when tested in horiz. posit, on its side.)

Aircraft flew one good hop.

Pilot: Air-driven transfer pump out. Light comes ON and fuel drops to 1100 pounds.

Mech: Aircraft turned up for 15 min. and checked all air tubing. All work A-OK on deck. Request test hop and put "G" on aircraft.

Failure occurred on bombing roll-in. Test pilot gave the plane a good wring-out, but could not duplicate the trouble. Three additional good hops, then:

Pilot: Fuel transfer light came ON and shortly after fuel dropped from 4600 lbs to 1100 lbs. Had slight (¼) negative G when light came ON.

Mech: Removed and replaced air turbine transfer pump. Turned up aircraft. Transfer checks good.

Aircraft flew seven good hops.

Pilot: Fuel transfer pump gage dropped 1200 lbs. Fuel transfer light ON—used emergency press.

Mech: Replaced fuel pressure switch and fuel transfer shutoff valve.

An outside chance, admittedly, but after two pumps, an exhaustive study of the system, and an inability to duplicate the failure on the deck, it was worth a try. Aircraft flew four good hops

Pilot: Probable fuel transfer pump failure. Fuel transfer light came ON on takeoff, fuel quantity dropped to 1100 lbs after about 5 minutes of flight. Used emergency transfer, light went out and fuel quantity went back up.

Classical description of fuel transfer pump failure.

Mech: Replaced fuel level control float valve.

Pilots were asked to land, if feasible, without activating emergency transfer if failure recurred—and by this time—forgive us— most of us were sure it would. The plane was scheduled only for hops within a 50-mile radius of the field. Aircraft flew three good hops.

Pilot: Fuel transfer light came ON during first five minutes of hop. Normal transfer in emergency.

Mech: Pressure-checked system. Believe to have found blockage in air line. Blew line out and system checked OK.

This was the first break; the pump was found not turning, and a feeble air flow in the line from the compressor was traced. When the air line leading through the firewall was temporarily closed off, then opened, full air flow resumed, and the mechanic thought something dislodged and hit his hand as it exited. Aircraft flew two good hops.

Pilot: Transfer light came on briefly and went off some time later. Fuel dropped to 1100 lbs and ladder light stayed OFF. Fuel quantity seemed to hold at 1100 lbs. Believe pump is pumping below capacity and gradually bag falls to 1100 lbs.

Mech: Removed and checked fluid air cooler. Checked all air lines to pump—found two bolts missing from anti-icing line which would allow loss of 12th stage air if icing switch were ON. Turned aircraft and burned to low level four times. Transfer appears normal—cannot make light come ON or find any other discrepancy on deck.

Aircraft flew four good hops, but you guessed it:

Pilot: Fuel transfer light again. Immediately used the emergency transfer. Fuel never fell to 1100 lbs. I tried to burn it down before landing, but it never fell.

Mech: Again checked entire transfer system. Removed line and found no restrictions —turned aircraft for one hour—no discrepancy found in transfer system.

Perhaps a NARF would have solved the mystery by now—it was obviously an intermittent blockage of the 12th stage air, but all the lines through the airframe had been blown and probed, and of the eight failures only one had persisted on deck. Only the engine itself remained to be checked. Aircraft flew nine good hops, and as luck would have it, shortly after the engine itself became suspect, its last fuel transfer pump failure occurred.

Pilot: Fuel would not transfer from wing to fuselage except in emergency.

Mech: Turned aircraft. Found loss of air from 12th stage. Removed plate and found bolt blocking air passage.

This terse writeup signals the end for the phantom glitch. The air loss was carefully traced to the entrance to the engine manifold, where a cautious probe into the line produced a blast of air. The engine was secured, the plate removed, and a bolt discovered. A bolt was aimlessly tumbling in the turbine bleed air manifold, and at intervals as predictable as the fall of the ball on a Las Vegas roulette wheel, came to rest across the air outlet to the fuel transfer pump, and was held there by air pressure until dislodged.

Its markings, SPS, 537, matched those of the bolts securing the fuel nozzles ringing the combustion chamber. Examination of this area discloses that an object dropped through one of the top three fuel nozzle openings could deflect into the opening for 12th stage air in the adjacent turbine guide vanes.

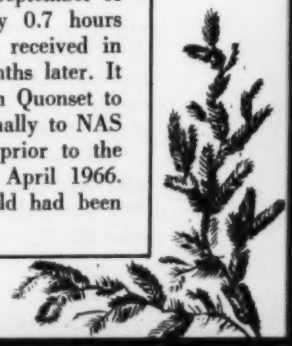
Here's an interesting conjecture concerning the bolts: same diameter and pitch as the phantom but different length missing from the anti-icing line to this same manifold connection. Could the bolt shortage be the result of dropping one through this opening? It would wind up in the same place. But then we'd have to assume that he who dropped it was using the wrong bolts and quit when he ran out—an unlikely guess. A third opening from the manifold exists, to the air conditioning turbine. The five o'clock position of the transfer pump turbine line, however, gave it better odds than this much larger opening at the top of the engine.

If the plane were flown more often in a negative "G" state, the problem may have been solved with a catastrophic failure of the air conditioning turbine.

The moral, in short; *Account for all tools and hardware after every maintenance action!*

Engine history note:

The engine was overhauled in September of 1965, and had accumulated only 0.7 hours since that overhaul when it was received in VA-83 by aircraft transfer 8 months later. It had been shipped in the can from Quonset to Rota, to Naples, to Oceana, and finally to NAS Jax, where it was installed just prior to the ferry/test flight to VA-83 on 26 April 1966. The compressor bleed air manifold had been changed during that overhaul.



NOTES

and comments on maintenance

Nose Strut Servicing

MINOR structural damage to an A-4C occurred when a young airman filled the extended nose strut with hydraulic fluid, capped it off, then tried to raise the gear during the drop check. The squadron's commanding officer, reflecting on human nature, endorsed the report with these comments on the airman's misguided attempt to shorten his job.

"This (was) our second ground accident involving overserviced nose struts within five weeks. The circumstances were similar but there was a notable difference which, although it can't excuse or justify the accident, illustrates how the squadron made the same costly mistake twice.

"The road to disaster began the same way each time—a qualified supervisor asked a nonrated man if he knew how to perform a task and received an affirmative answer. The difference in the cases was: The man responsible for the first accident did not know how to service the strut. He thought he knew and was not willing to admit his lack of skill. The man responsible for this (the second) accident, did (in theory) know how to do the job properly. However, he decided to take (what he thought would be) a shortcut without advising his supervisor.

"He did not understand why the nose strut on an A-4 must be serviced in accordance with the manual. It is quite unlikely that he was not told the 'why' of the procedure . . . (in the course of his training). More probably he was told, but the fact did not register. He was TAD . . . when the last accident occurred. He did not receive the refresher training given all structural mechanics after that accident.

"He had, under close supervision, serviced several nose struts at (another facility). This was to be his first experience under 'loose' supervision. Having done the job right (previous to this) he apparently felt qualified to take a short cut. When he did this without telling his boss he accepted full responsibility for the results.

"Why did he feel he had to take a shortcut? His explanation was that he and his supervisor had two more jobs to do before they could secure. (They had been working since 1530 and it was almost 2230.) Both men had worked 10 to 12 hours per day for a week in an effort to have all aircraft available for deployment.

"He understands now that every man in this squadron could make the same excuse in every job they do, and that if they all used this rationale, we would have 14 broken A-4Cs.

"—is a good man. . . He obviously was not as good a man as I thought, but (he) is now a better man from this experience."

Let us all profit.

Torque Topic

SHORTLY after takeoff, an SP2H's main Hydraulic system reservoir return line failed with a rapid loss of fluid. The system was drained and engine pump pressure went to ZERO. While the aircraft burned down to landing weight, the large accumulation of fluid on the flight deck and in the radio compartment was flushed out the bomb bay. The landing gear was lowered by the emergency system and the aircraft brought to a stop on the runway through use of differential reverse and emergency brake.

The incident was caused by failure of a gasket (Part No. AN 6227-11) in the main hydraulic system reservoir return line located on the aft face of the wing beam. The gasket had been deformed, possibly due to overtorquing of an adjacent nut on the return line.

Ladder portability is improved by adding wheels.

Ladder Mod

PREFLIGHT daily inspections and minor maintenance needs present a problem at times when there aren't enough small work stands to go around. At VP-31 the problem is accentuated by the number of aircraft turnarounds in a small time frame.

The use of ladders has been a solution, but the stability of the ladder decreases rapidly with the height at which a person is working.

To improve the stability, a 5′ length of 2 x 4 was bolted to the ladder shoes and the sliding brace was bolted to the ladder (FSN RM 1730-014-1519). Two dolly wheels were attached so that they would be off the ground when the ladder was erected and on the ground when folded for portability. One man can safely move the ladder.

After personal testing, the ASO breathes much easier when he sees a man using one of these ladders.

—Contributed by LT. G. E. Ruckersfeldt
ASO, VP-31, Moffett Field

Braces and ladder shoes improve stability.

Pro Work

IT has been said that "playing a piano by ear may sound nice after a fashion but it's not very professional." Some mechanics tend to play by ear.

It is recognized that an individual's judgment plays a large part in troubleshooting, what component must be changed and what adjustments must be made. Aircraft require that installation of components, adjustments, inspections and functional testing be accomplished with the greatest care and exactness.

Aircraft require the professional approach by all concerned. Take time to look it up in the *Maintenance Instruction Manual* and other applicable directives. Be a professional—*Don't* play it by ear.

—MAG-26 "Safety Raiser"

Stoddard Solvent Is Flammable

WHEN an air compressor was used to force Stoddard solvent from a 55-gallon drum into a wash rack reservoir, the hose from the drum blew off the standpipe at the drum. Solvent from the drum sprayed into the air and the wind blew the spray over the compressor. The compressor and a C-130 aircraft were positioned downwind from the drum.

The sprayed solvent ignited at the air compressor and fire spread to the aircraft resulting in extensive damage to the *Herc* even though the fire was extinguished within five minutes.

Investigation revealed that personnel were not aware of the flammable qualities of Stoddard solvent. This was generally the case in all of the persons contacted including highly experienced safety and maintenance personnel.

NavSo P-2455, Safety Precautions for Shore Activities, para. 2055.1a states although Stoddard solvent has a flash point above 100° F, it is flammable and appropriate precautions should be taken to minimize the fire hazard.

In this case, supervisory factors also contributed to the fire in that:

(1) The gas engine-driven air compressor (source of ignition) was less than 50′ away from the aircraft.

(2) Failure to clamp solvent transfer hose to solvent drum standpipe; and

(3) Failure to provide adequate fire extinguisher equipment (the one on hand was improperly positioned).

Danger! Don't Try This Either

An engine was being run in a test cell at 80 percent speed. One of the operators decided to clean the compressor by dashing a quantity of solvent into the compressor inlet. The type of solvent is unknown. The

violent compressor stall that resulted severely damaged the compressor; the arms and face of the operator were burned. The results could have been much worse.

Remember that there are some mighty hot fires burning just aft of the compressor and flammables thrown into the engine inlet are bound to ignite with explosive force.

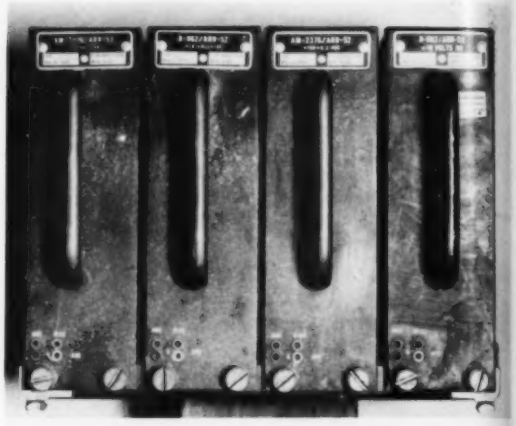
Don't Mix Catalysts

A CHEMICAL explosion which occurred when fiberglass repair materials were improperly mixed, injured the man on the job. Fiberglass repairs are made with either of two groups of materials: polyester resin, a promoter and a catalyst; or epoxy resin and a catalyst.

Mixing polyester catalyst with epoxy catalyst produces highly reactive results. Polyester materials and epoxy materials are not interchangeable.

The two groups of fiberglass repair materials should be stored separately. They should be plainly marked and warning signs posted where the chemicals are used. Only trained personnel should have access to fiberglass materials.

—BuShips Journal



RIGHT PARTS—WRONG LABELS—Four sono receivers which were removed from an S-2E during corrosion control inspection raised some eyebrows in VS-28. All are identical R-962/AAR-52 sono receivers but two are identified as sono amplifiers AM-2376/ARR-52. While no problems developed from the installation of the receivers in the aircraft such mislabeling could cause confusion in supply activities. It was concluded that the parts were mislabeled by the manufacturer.

—LCDR T. W. Entwistle, ASO, VS-28

C-2A External Safety Lights

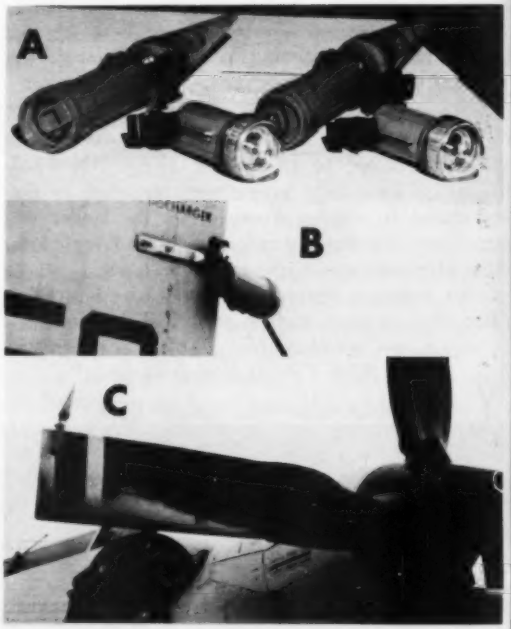
GROUND ops can be a serious problem especially in those aircraft which require an external power source to provide external lights for night towing purposes. The C-2A is such an aircraft and is subject to considerable night towing between the maintenance area and air terminal at busy, overcrowded NAS Cubi Point.

We solved the external light problem with an inexpensive clamp-on flashlight. A complete set of towing lights (photo A) consists of:

- 2 standard 2-cell flashlights with batteries
- 2 standard 1-cell flashlights with batteries
- 4 universal 6″ clamps
- 4 heavy duty alligator clamps (rubber covered)
- 4 work lenses

For night towing one 1-cell is clamped onto the trailing edge of each vertical stabilizer (photo B), and one 2-cell is clamped onto the outboard prop tip of each engine (photo C).

Lights are easily attached, do not damage prop or control surfaces, offer maximum visibility in all directions and readily outline the maximum width of the aircraft.—*Contributed by VRC-50*



Crunch Prevention, *Stoof* Series

A tedious repair job will be required.

Steel against aluminum is hard on aircraft.

THE INSTRUCTIONS were to spot the E-1B aircraft forward of the number 3 elevator and facing inboard. For the model aircraft, this presented a difficult maneuver which required the starboard tongue of the tow-bar to be hooked to the port aft tow-ring in order to swing the aircraft around for aft towing. Unfortunately, at the most inopportune moment, the ship rolled and turned the aircraft into the tow-bar (photo shows fuselage skin damage).

Because of the basic similarity of the C-1A, the S-2 and the E-1B fuselages, aircraft handling crews tend to maneuver all three models in identical ways. This is a dangerous tendency since the E-1B tow points are located differently. Moreover, the balance and wind sail characteristics are radically different.

Resulting recommendations are:

- Avoid spotting the E-1B in a position where it is impossible to connect both of the aft tow-rings;
- Tow the E-1B for and aft only by the nose. Sideways movement can result in tearing out the nose tow-rings;
- When single-point tow by the tail is the only method by which the aircraft can be moved, the director must ensure that the tow-bar remains perpendicular to the aircraft's longitudinal axis.

SEA KING gets mirrors—A flight safety and operations improvement item for pilot and copilot has been authorized by Airframe Change 197. The AFC, based on Sikorsky Drawings ECP 5370 was approved by ACCB 71-749 on 29 March 1967.

Helo Hot Brakes

AN SH-3A was being towed across the air station back to the squadron area at 5 mph when the tractor driver noticed a burning odor. Thinking that something was wrong with the tractor he stopped, and discovered that the port wheel of the helo was on fire.

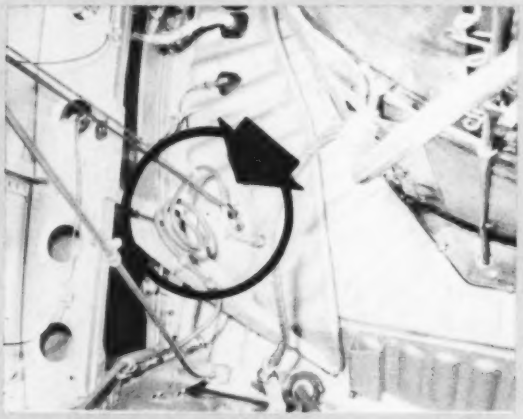
The driver entered the aircraft and got a CO_2 fire extinguisher which he applied to the top of the burning brakes. The small extinguisher wasn't sufficient to keep the fire out, so he unhitched the tractor and drove to the hangar to get an Ansul fire bottle. Another crewman joined the driver on the return trip to the helo. As they approached, the helicopter's tires blew one at a time.

Rather than using the Ansul bottle, the crewmen applied more CO_2 to the wheel, and finally extinguished the fire.

A case of hot brakes is not one usually associated

with helicopters, nevertheless it can and did happen. In this case, it appears as though an overserviced brake kept pressure on the brake pucks due to excess fluid in the system—a condition that was aggravated by hot weather. As the aircraft was towed, the brake assembly heated enough to burn the hydraulic lines and the tires and cause a considerable amount of smoke.

Fortunately for those personnel near the aircraft, the wheel did not blow up when extremely cold CO_2 came in contact with it. The hazard that exists when a cold substance comes in contact with a hot wheel assembly should be reemphasized to all crewmen and line personnel. It is especially noteworthy in this case, that it was a very senior and experienced crewman who administered the CO_2 in his eagerness to put out the fire.



Control cables can rub mispositioned liquid oxygen tubing

Plumbing Goof

TIGHTENING a B-Nut on one end of a bulkhead without holding the locking nut on the other side of the bulkhead with a wrench can produce the maintenance goof and flight hazard illustrated here.

The TA-4F had just come out of its first calendar inspection when inspectors found the aft cockpit rudder control cable, PN 7445535-793, rubbing against *liquid oxygen tubing*, PN 5824244-1 at station 262-342. NavAir 01-40AVD-4-6, p. 242, Fig. 99, item 11 refers.

Inspectors noted that the close proximity of the two items, improper plumbing connection practices and slack cables when the tail is removed may trip the unwary into overlooking this potential hazard. *A-4 maintainers, please take heed.*

Hand Signal Gloves

Bright orange gloves worn by RANDOLPH'S yellow-jerseyed directors aid pilots in responding to director's hand signals, particularly during rain or reduced visibility.

Type E Preservation

SECTION XII and Table 5-1 of *NavWeps 15-01-500, Handbook Preservation of Naval Aircraft*, contains instructions which establish standard cleaning, preservation, packaging and packing procedures for aircraft and aircraft material that have been involved in salt water crash damage or subjected to fire fighting chemicals.

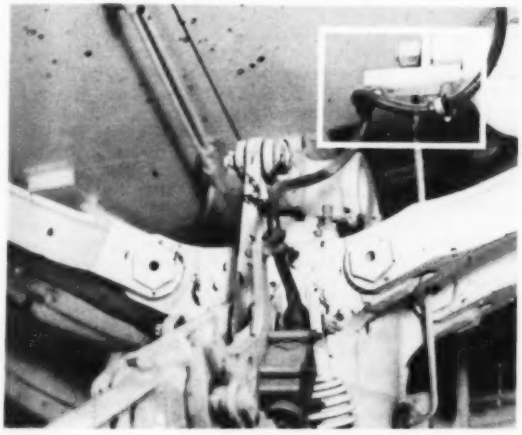
The basic purpose of Type E preservation is to ensure that the greatly accelerated corrosive action induced by salt water, fire fighting chemicals and their residues is arrested and the resulting corrosion damage inhibited. Essentially, Type E preservation consists of removing all traces of salt water, salt deposits, or fire fighting chemicals; washing the affected items and preservation by the application of specified compounds or oils.

Since expeditious action is necessary for effective Type E preservation all Maintenance Departments should be aware of the contents of this publication in case the need ever arises.

It Doesn't Fit—A van driven by unauthorized person(s) on the ramp area at night was aimed between No. 3 and 4 engines of a C-118. The end result—crunched aircraft, crunched van—a needless and irresponsible act that doesn't fit into any scheme of operations.

P-3 Wiring Goof

1. Electrical lead almost severed (inset) because of misrouting.



2. Correct routing and clamping eliminates loop in wiring.

WHEN the pilot of a P-3 lowered the gear for a landing, the starboard main gear barber-poled. Upon recycling, the gear still indicated UNSAFE. He executed the NATOPS emergency checklist for unsafe gear indication including a tower fly-by and landed with the unlocked gear indication without incident.

Postflight inspection revealed the electrical lead to the starboard landing gear downlock switch was nearly severed (see photo 1). The lead had been misrouted during PAR. This was the second flight after acceptance. Inspection of other aircraft recently out of PAR revealed no others with this discrepancy.

The correct installation is shown in photo 2. Note how cable routing eliminates loop formed in the misinstallation.

—Contributed by VP-19

Murphy's Law*

Down and Murph'd

WHEN a pilot lowered his gear on GCA, he found the right main indicating UNSAFE. He went around and had the pilot of another airplane check it for him. Both mobile control and the other pilot said the gear looked down-and-locked, so he went ahead and landed. As soon as he came to a stop on the runway, the pilot had gear pins inserted and taxied to his parking place.

Maintenance found gear position indicating wires from the *left* gear broken. Scratching their heads, they checked further and learned that the cannon plugs on the indicators had been Murph'd . . . crossed! No one had any idea how long this bird had been flying around with the left indicator showing that the right main was down-and-locked . . . and vice versa.

— TAC Attack

Although this incident involved an Air Force B-66 (similar to Navy A-3), there's a lesson to be learned here. It could happen to us if we fail to comply with the requirement that a functional check be made whenever plumbing or wires are reconnected.

By the Numbers

SHORTLY after touchdown from a normal mission, the F-4 pilot saw his canopy up and leave the aircraft. His canopy switch had been in CLOSE, but investigators later found the canopy latching mechanism was unlocked and the actuating rod retracted. The actuator rod shear pin had sheared.

The canopy pressure regulator was pulled and given a bench-check. During the first 30 minutes of operation it performed normally. After the pressure went to 2500 lbs and held there, they decided to take a look at the canopy normal system relief valve. It was the wrong one! Instead of the 1280-lb valve that is supposed to be there, they found one rated at 3500 lbs.

The two valves look the same from the outside. Only the part numbers are different. With the wrong valve installed, full system pressure was applied to the CLOSE side of the actuator piston when the regulator failed. In time the shear pin went . . . and with it the canopy. Check the MIM and PN.

—TAC Attack

*** If an aircraft part can be installed incorrectly, someone will install it that way!**

LETTERS

Want your safety suggestion read by nearly a quarter of a million people in naval aviation? Send your constructive suggestions to APPROACH.

Ear Blocks

NAF Washington, D. C.— The statement by LT R. S. Case, MC, in the September 1967 issue on ear blocks ("Avoid Those Ear Blocks," p. 11) that nitrogen is not absorbed by the body tissues is sufficiently misleading to warrant correction. Nitrogen is, of course, absorbed by the body tissues and its release into the body tissues is the major factor in the production of the bends.

What Dr. Case probably intended to say is this: Nitrogen at one atmosphere pressure and 79% concentration is not as readily absorbed by the tissues surrounding the middle ear as oxygen at one atmosphere and 100% concentration is absorbed by the tissues surrounding the middle ear. Oxygen at 100% concentration is occasionally so readily absorbed that a vacuum is created in the middle ear. The vacuum stretches the drum and causes pain, usually several hours after a 100% oxygen flight. This unpleasant aftereffect can be avoided by performing the valsalva maneuver three or four times after flying on 100% oxygen. The valsalva maneuver is performed by holding one's nose and gently blowing. This will gradually reduce the concentration of oxygen in the middle ear and lowers the possibility of a significant vacuum developing in the middle ear.

LT E. B. FEEHAN, MC
NARTU WASHINGTON

• Here are Dr. Case's comments: "Dr. Feehan's point is indeed well taken as it is specifically true. However, the article was originally written for flying personnel (who never experience more than one atmosphere of pressure) and in these circumstances the absorption of nitrogen by the body tissues is practically nil. I might better have stated that 'Nitrogen . . . is not readily absorbed . . .' Tell Ed, 'Touché!'"

NAS Olathe Tacan

NAS Olathe—Many pilots of transient aircraft stopping at NAS Olathe gripe the DME portion of (1) the station tacan (NUU), or (2) the tacan in their aircraft.

NAS Olathe tacan operates on Channel 1, at the extreme low end of the band. AN/ARN-21 equipment is normally peaked at the center of the frequency spectrum and supposedly on both ends. As the equipment is operated it apparently loses some of its efficiency, the loss progressing from both ends toward the middle. Consequently, when pilots tune in Channel 1, many times they fail entirely to get a DME lock-on, or it will not lock on until they are close in.

The station tacan equipment is continually peaked and special flight checks are made by the FAA upon request of NAS Olathe. These checks prove the station gear to be operating well within limits. Next, the griped aircraft's tacan is checked out and found to be operating but not peaked up on the end channels.

Unnecessary manhours and money are lost in troubleshooting workable airborne gear and in flying extra flight checks. NAS Olathe has tried, but for several good reasons has been unable to get a higher tacan channel.

It would be appreciated if in some way, through APPROACH, etc., your Center could help get the word out that, unless their airborne tacans are critically bench aligned, transients may expect tacan reception difficulties on any channel at or near the high or low ends of the band.

A notice has been submitted for inclusion in the remarks section of the NAS Olathe entry in the FLIP Enroute Supplements.

CAPTAIN W. F. CULLEY
COMMANDING OFFICER
NAS OLATHE

• Transients, take note—your set may not be up to snuff.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the U. S. Naval Aviation Safety Center.

Wheels UP Landings

NAS North Island—Your article "Wheels, Wheels, Wheels" in the September 1967 edition of APPROACH doesn't mention one very important point. When the pilot initiated a waveoff by adding full power and retracting the landing gear while on final, he terminated his landing approach; he didn't have an approach to continue at that point. While habit interference was no doubt contributory, the accident would probably not have occurred had the pilot continued the waveoff

FOD Prevention Idea

MCAS Beaufort—A FOD-for-Thought board is used to give our FOD prevention program a shot in the arm. Our aim is to make maintenance people and pilots more acutely aware of the magnitude of the FOD problem. In addition to awareness, it is hoped that it will generate participation in the FOD prevention effort.

Foreign objects found by pilots are posted on the board located in the line shack. In the short time the board has been in use it has given our program a shot in the arm in awareness and some participation.

CAPT. T. C. McCLAY
ASO VMF(AW)-451

Found foreign objects generate "FOD for Thought."

and re-entered the pattern. In this case the pilot tried to salvage a bad (aborted) approach when he wasn't even in the landing configuration.

LCDR G. E. TOMPKINS
ASO CAEWW-11

• Thank you for your interest in this ever-present problem. Obviously, however, the pilot in question did not share your point of view that he had "terminated his approach." We all know, in retrospect, that he should have done as you suggest but—he didn't. So—another accident that could have been avoided occurred. Let's hope this discussion will stimulate more thinking which will assist in preventing similar potential accidents from occurring.

Physical Fitness

APO New York—I have just finished reading an article entitled "High Performance Flyers for Modern Aircraft" by Dr. J. R. McTammany and CDR A. J. Toth in the April 1967 APPROACH. I consider it one of the better articles on this topic. It is well-written, easily read and understandable. I feel that it very aptly defines the problem (as all articles of this type do) but, much more, it gives good recommendations, both general and specific, for correction of this problem.

I have been trying to encourage a program of weight reduction and physical fitness among aviation personnel and "ground pounders" with varying results. I would like to obtain a number of reprints of this article, if possible, to assist me in these efforts. Keep up the good work!

CAPT RONALD K. MILLER
FLIGHT SURGEON
DET. C, 504TH S&T BN

• We appreciate your comments. Reprints of the article are on their way. By now you have probably read "Be a Weight Watcher" by CAPT Jerome A. Moore, MC, in the October 1967 issue. CAPT Moore, force surgeon, FMFLant, is well known throughout the Navy for the weight reduction programs which he has instituted at various stations and aboard ship.

Parachute Inspection

NAS Glenview—Has there been any action taken yet concerning the suggestion to authorize deviation of the parachute inspection to coincide with the aircraft calendar inspection as suggested in the letter to Headmouse, "Parachute Inspection," June 1967 APPROACH?

AME1 HENRY F. HORTON

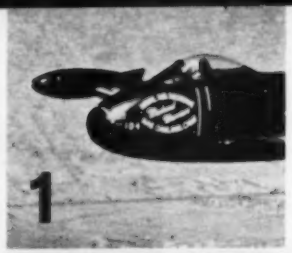
• To date we have nothing new. The Naval Aerospace Recovery Facility, El Centro, is to report on this at the December Aviation Personal Survival Equipment Team meeting.

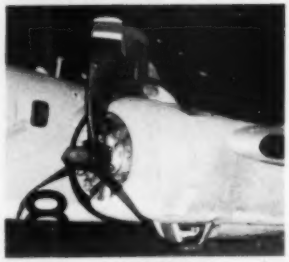
Vol 13 **approach** No. 6

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

CONTENTS

DEPARTMENTS





NavAir 00-75-510

CREDITS

Front Cover Painting by R. G. Smith Courtesy Douglas Aircraft Co., Inc., Long Beach, Calif.

Purposes and policies: Approach, published monthly by the U. S. Naval Aviation Safety Center, is distributed to naval aeronautical organizations on the basis of 1 copy per 10 persons. It presents the most accurate information currently available on the subject of aviation accident prevention. Contents should not be considered as regulations, orders or directives and may not be construed as incriminating under Art. 31, UCMJ. **Photos:** Official Navy or as credited. Non-naval activities are requested to contact NavAvnSafeCen prior to reprinting APPROACH material. **Correspondence:** Contributions are welcome. The right to make editorial changes to improve the material without altering the intended meaning is reserved. Reference to commercial products does not imply Navy endorsement. Views of guest written articles are not necessarily those of NavAvnSafeCen. **Distribution:** if you are receiving the magazine free because of military or commercial contract status with the Navy . . . Requests for distribution changes should be directed to NavAvnSafeCen, NAS, Norfolk, Va. 23511. Phone: Area Code 703, 444-4279 (days), 444-3520 (Nights, weekends, Holidays) Att: Safety Education Dept., IF YOU ARE A PAID SUBSCRIBER, address all renewals and address changes to Division of Public Documents, Washington, D. C. 20402. **Subscriptions:** Single copy 35 cents; 1-year subscriptions $3.50; 2 yrs., $7.00; 3 yrs., $10.50; $1.00 additional annually for foreign mailing. **Printing:** Issuance of this periodical approved in accordance with Department of the Navy Publications and Printing Regulations, NAVEXOS P-35. Library of Congress Catalog No. 57-60020.

RADM Paul D. Buie, Commander, U. S. Naval Aviation Safety Ce

Santa as seen by. . .

Medical Officer:
First we've got to get on a good diet and above all knock off these night hops.

Admin Officer:
Sorry about that, Nick, we're on port and starboard so no leave till after New Year's.

Maintenance Officer:
Sled runners, harness and struts we've got, but replacement reindeer parts . . .

The Plane Captain:
Everybody else has Christmas off, but no, I've got to stick around and polish this dumb sleigh.

The LSO:
OK, Santa baby, let's take it around one more time and this time do something about that red landing light.

His Wife:
How come you're never home for Christmas?

The Taxi Director:
Guide you into position, I'll do, give you a choice parking spot, I'll do, but clean up after 8 lousy reindeer—never.

NOTAM 121438 KNGU 2992 NGU URGENT X ALL AIRMEN CAUTIONED TO BE ON ALERT PERIOD 24/25 DECEMBER FOR HIGH DENSITY LOW LEVEL TRAFFIC EXPECTED DURING SUBJECT PERIOD X MAINTAIN PARTICULARLY VIGILANT LOOKOUT FOR SINGLE LOW FLYING CRAFT VICINITY ALL POPULATED AREAS X SUBJECT CRAFT DESCRIBED AS SINGLE PLACE MULTI-DEER PROPELLED TRANSPORT IN OVERLOADED STATE MAKING NON-STANDARD LETDOWNS AND APPROACHES ENROUTE FROM POINT OF DEPARTURE LAT 9ØN X ADIZ PENETRATION PROCEDURES WILL NOT APPLY X ALL CONCERNED UNITS DIRECTED TO ASSIST EXPEDITIOUS COMPLETION OF MISSION WITH APPROPRIATE VIP WELCOME AND SERVICING AS INDICATED X
TO INSURE COMPLETE SUCCESS OF THIS OPERATION EXTRA CARE URGED FOR ALL AIRMEN ON HOME-FOR-CHRISTMAS FLIGHTS X ONLY IN THIS MANNER WILL OPERATION MERRY CHRISTMAS BE ACCOMPLISHED X
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